

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME
MARINE RESOURCES OPERATIONS

FISH BULLETIN No. 106

AGE AND LENGTH COMPOSITION

Pacific Coast Catches

SARDINES AND PACIFIC MACKEREL

1955-56 and 1956-57 Seasons

and the

NORTHERN ANCHOVY

1954-55 Through 1956-57 Seasons



1958

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FOREWORD

This bulletin is a report on a continuing study of the pelagic marine fisheries of California under the sponsorship of the Marine Research Committee.

The information presented is basic to the understanding of the fishery and is part of the foundation upon which a more complete knowledge of its dynamics will be based.

The age and length composition of the catches of three of the more important pelagic marine fishes of California are included in this bulletin. The data are presented in four separate papers.

The age and length composition of the sardine catch has been determined annually since the 1941-42 season. Data previous to the 1955-56 season have appeared in nine reports. The age and length composition of the catches of 1955-56 and 1956-57 are treated in separate papers (Felin, et al., for 1955-56; Wolf, et al., for 1956-57). Age determinations of sardines are made from scale samples. A bibliography of previous reports in the series is given in Wolf, et al.

The report on age composition of the Southern California catch of Pacific mackerel is the sixth in a continuing series since the 1939-40 season. This report deals with the age compositions of the 1955-56 and 1956-57 seasons. Age determinations of Pacific mackerel are made from otoliths. Previous reports in the series are listed under references in the present report.

Age and length composition of the northern anchovy catch has been determined since the 1952-53 season. The present report is the second in a continuing series. It covers the 1954-55, 1955-56 and 1956-57 seasons and includes length and age data for the commercial catch and the live bait catch. Age determinations are made from scale samples.

Research on age and length compositions of the sardine and anchovy catches is conducted co-operatively by personnel of the Marine Resources Operations of the California Department of Fish and Game and the South Pacific Fishery Investigations of the U. S. Fish and Wildlife Service. Determinations of the age composition of Pacific mackerel catches are made by the California Department of Fish and Game. Both organizations gratefully acknowledge the help provided by the Marine Research Committee in supplying the funds for the publication of the present volume.

AGE AND LENGTH COMPOSITION OF THE SARDINE CATCH OFF THE PACIFIC COAST OF THE UNITED STATES AND MEXICO IN 1955-56

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and

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This is the tenth report on age and length composition of the catch of sardines (*Sardinops caerulea*) off the Pacific coast of North America. Earlier reports give similar data from 1941-42 to the present season (Felin et al., 1955).

During the 1955-56 season, 73,257 tons were landed at California, all caught below Pt. Conception; this includes fish landed at Santa Barbara, Port Hueneme, Santa Monica, Los Angeles-Long Beach Harbor, and Newport Beach. Fish from Santa Barbara and Port Hueneme were trucked to Monterey, Moss Landing, and San Francisco. The largest amount of trucking occurred during October, when the fish were most available in the vicinity of these two ports and the Los Angeles area canneries were not operating. Later, some fish were trucked from Santa Monica and Newport Beach to the Los Angeles area. A few landings in the central California area in October were made by boats which caught fish below Pt. Conception and carried them northward in refrigerated brine tanks.

A total of 4,764 tons was landed in Baja California during the calendar year 1955. Landings from August through December only are included here, to approximate the California season; during these months, 1,707 tons were landed.

The fishing season in Southern California extended from October 1 through February 1; that in central California from August 1 through January 15.

Sampling was conducted at Port Hueneme during October and at San Pedro during the remainder of the season by personnel of the California Department of Fish and Game. Limited sampling at Ensenada was carried out by personnel of the U. S. Fish and Wildlife Service. Age determination was continued co-operatively by personnel of the California Department of Fish and Game and the United States Fish and Wildlife Service.

Length-frequency distributions of sardines of each year class based on random scale samples taken at San Pedro are reported by sex (Table 1). Nine year classes are represented in the catch, with numbers ranging from 458 fish of the 1952 class (3-year-olds) to one fish each in the 1947 and 1946 classes (8- and 9-year-olds). There were 500 males and 430 females for a total of 930 fish samples for aging. Their lengths ranged from 192 mm. to 246 mm.

Calendar dates and numbers for each lunar period of the 1955-56 season are presented in Table 2. Dates are given from one full moon to the next. Lunar months have been numbered serially since "November" of the 1919-1920 season (Scofield, 1926).

Total tonnages and numbers of fish of each age are given for California and Baja California (Table 3). The estimates of numbers have been derived in the same manner as described for preceding seasons (Felin, et al., 1953). Three-year-old fish (1952 class) dominated the catch, making up nearly 49 percent of the fish landed by number. The 1951 class (4-year-old fish) made up about 25 percent of the number of fish caught. Younger fish (1- and 2-year-olds) were not well represented in the catch, making up only about 15 percent of the landings.

The mean length and standard error of the mean for each year class sampled during the 1955-56 season are tabulated by sex in Table 4. These calculations are based on the length composition of each age as presented in Table 1. Mean lengths ranged from 203 mm. for the 1954 class (1-year-olds) to 222 mm. for both 1948 and 1949 classes (6- and 7-year-olds).

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TABLE 1
Length Composition of Year Classes in the San Pedro Catch, 1955-56 Season

Age Year class	1 1954			2 1953			3 1952			4 1951			5 1950			6 1949			7 1948			8 1947			9 1946			Total		
Standard length mm.	M ¹	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
190	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
192	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
194	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
196	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
198	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
202	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
204	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
206	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
208	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
210	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
212	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
214	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
216	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
218	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
220	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
222	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
224	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
226	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
228	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
230	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
232	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
234	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
236	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
238	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
240	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
242	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
244	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
246	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Totals	9	9	18	64	45	109	237	221	458	135	112	247	24	20	44	10	6	16	19	17	36	1	--	1	1	--	1	500	430	930

¹ M—male; F—female; T—total.

TABLE 2

Calendar Dates of Lunar Months for the 1955-56 Season

Lunar months	Lunar month (number)	Dates
"August"-----	443	August 3-31
"September"-----	444	September 1-30
"October"-----	445	October 1-29
"November"-----	446	October 30-November 28
"December"-----	447	November 29-December 28
"January"-----	448	December 29-January 27
"February"-----	449	January 28-February 26

TABLE 3
Age (Year Class) Composition of the Sardine Catch in the 1955-56 Season
(Numbers of fish are given in thousands, i.e., 000 omitted)

	Catch		Number of fish by age and year class									
			1		2	3	4	5	6	7	8	9
	Tons	Nos.	1954	1953	1952	1951	1950	1949	1948	1947	1946	
San Pedro												
"October "	13,806	94,809	2,351	6,087	50,685	24,708	3,792	2,588	4,598			
"November "	37,049	263,582	6,536	40,486	131,371	60,729	11,598	4,006	8,856			
"December "	20,462	143,714	1,380	18,625	64,499	42,884	7,013	3,219	5,174	460	1946	
"January "	1,895	12,724	532	2,106	5,437	2,822	1,272	46	506			
"February "	45	304	13	50	130	68	30	1	12			
Totals California	73,257	515,133	10,812	67,354	252,122	131,211	23,705	9,860	19,149	460	460	
Ensenada ²												
"August "	116	793	20	51	424	206	32	22	38			
"September "	7	49	1	3	26	13	2	1	3			
"October "	55	375	9	24	201	98	15	10	18			
"November "	218	1,541	38	237	768	355	68	23	52			
"December "	1,311	9,149	88	1,186	4,106	2,730	447	205	329	29		
Totals Baja California	1,707	11,907	156	1,501	5,525	3,402	564	261	440	29	29	
Grand totals	74,964	527,040	10,968	68,855	257,647	134,613	24,269	10,121	19,589	489	489	

¹ Landings made from January 29 to February 2.

² Numbers of fish in the Ensenada catch were prorated at the same ratio as the San Pedro catch for comparable months. For "August" and "September" the San Pedro ratios for "October" were used.

TABLE 4

Number of Fish, Mean Length and Standard Error of the Mean for Each Year Class
in the 1955-56 Season, by Area of Catch

	San Pedro		
	No.	M.	S.E.
1954 (1-ring)			
Male	9	201	1.05
Female	9	205	0.89
Total	18	203	0.82
1953 (2-ring)			
Male	64	206	0.67
Female	45	207	0.81
Total	109	206	0.52
1952 (3-ring)			
Male	237	212	0.37
Female	221	216	0.41
Total	458	214	0.29
1951 (4-ring)			
Male	135	213	0.56
Female	112	219	0.72
Total	247	215	0.48
1950 (5-ring)			
Male	24	217	1.66
Female	20	226	1.35
Total	44	221	1.29
1949 (6-ring)			
Male	10	219	1.27
Female	6	227	1.25
Total	16	222	1.33
1948 (7-ring)			
Male	19	220	1.26
Female	17	225	1.25
Total	36	222	0.97
1947 (8-ring)			
Male	1	--	----
Female	--	--	----
Total	1	--	----
1946 (9-ring)			
Male	1	--	----
Female	--	--	----
Total	1	--	----

AGE AND LENGTH COMPOSITION OF THE SARDINE CATCH OFF THE PACIFIC COAST OF THE UNITED STATES AND MEXICO IN 1956-57

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This is the eleventh report on age and length composition of the catch of sardines (*Sardinops caerulea*) off the Pacific Coast of North America. It covers landings of the commercial fishery for the 1956-57 season. Earlier reports give similar data from 1941-42 to the present season (see references).

During the season, 32,648 tons of sardines were landed in California. Of this, 62 tons were landed at Avila in August; the remainder was landed in Southern California after the October 1 opening of the season there. The latter included 24,466 tons landed in the Los Angeles-Long Beach Harbor area, 7,812 tons at Santa Barbara-Port Hueneme, 207 tons at Newport Beach, 98 tons at Santa Monica, and 3 tons at San Diego. Fish landed at Avila were trucked to San Francisco and Monterey for processing; fish landed at Santa Barbara and Port Hueneme were trucked to Oxnard, Monterey, Moss Landing, and San Francisco.

A total of 12,053 tons of sardines was landed at Baja California ports during the calendar year 1956; 5,971 tons were taken from "October," 1956, through "February," 1957, the period which approximates the Southern California season. Sardines were landed at Ensenada and Cedros Island in Baja California.

The sardine fishing season extended from August 1 through January 15 in Central California, and from October 1 through February 1 in Southern California. From October 1 to October 8, only boats based at Port Hueneme and Santa Barbara fished sardines. On October 8, the remainder of the Southern California sardine fleet started fishing.

Length and age samples were taken in Port Hueneme and San Pedro by personnel of the California Department of Fish and Game. Limited sampling at Ensenada, Mexico, was done by personnel of the United States Fish and Wildlife Service. Age determination was continued co-operatively by personnel of the California Department of Fish and Game and the United States Fish and Wildlife Service.

The length compositions of the Southern California age samples are summarized by year class (Table 1). Separate tabulations by sexes have been eliminated from this season's summary because seasonal sex ratios have not varied significantly during 15 years of sampling (1941-42 to 1956-57). These data have been collected however, and are available to anyone desiring them.

There were eight year classes represented in the Southern California catch including ages two through nine. The 623 fish sampled ranged in

length from 198 mm. to 254 mm. There was relatively little difference in mean lengths of the eight year classes; ranging from 224 mm. for 2-year-old fish to 236 mm. for 9-year-old fish.

Calendar dates of lunar months for the 1956-57 season are given in Table 2. Dates are given from one full moon to the next. Lunar months have been numbered serially since "November" of the 1919-1920 season (Scofield, 1926).

The age composition of the sardine catch in the 1956-57 season is given in Table 3. Numbers of fish of each age group are tabulated by lunar month and area of capture. Due to the low number of samples (6) taken at Ensenada, numbers of fish at each age for Baja California were determined by the use of Southern California age data.

The 1952 class, as 4-year-olds, contributed approximately 43 percent to the total number of fish. This, together with the 53 class (3-year-olds), comprised over 75 percent of the total. Only 7.5 percent of the catch (in numbers) was made up of fish under 3 years old.

A table that appeared in previous reports of this series, dealing with number of fish, mean length, and standard error of the mean for each year class, has been discontinued. Numbers of fish and the mean length of each age are contained in Table 1. Sufficient standard errors of mean lengths at each age have been published (Felin, *op. cit.*) to enable the reader to judge for himself the reliability of mean length determinations. These data are also available for the current season and may be obtained upon request.

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TABLE 1

Length Composition of Year Classes in the Southern California Catch, 1956-57 Season

Age..... Year class.....	2 1954	3 1953	4 1952	5 1951	6 1950	7 1949	8 1948	9 1947	Total M. and F.
Standard length mm.	M. and F.	M. and F.	M. and F.	M. and F.	M. and F.	M. and F.	M. and F.	M. and F.	
198.....	--	1	--	--	--	--	--	--	1
200.....	--	--	--	--	--	--	--	--	4
202.....	--	2	2	--	--	--	--	--	2
204.....	--	1	--	1	--	--	--	--	5
206.....	--	4	--	1	--	--	--	--	9
208.....	1	4	4	--	--	--	--	--	14
210.....	--	7	4	2	--	--	1	--	14
212.....	4	8	2	--	--	--	--	--	14
214.....	3	8	13	--	--	--	2	--	26
216.....	3	10	7	1	--	--	--	--	21
218.....	2	8	7	5	1	--	--	--	23
220.....	4	14	22	2	--	--	1	--	43
222.....	1	11	34	6	1	--	--	--	53
224.....	4	13	15	5	1	2	--	--	40
226.....	7	18	39	12	1	--	4	--	81
228.....	4	15	29	8	2	1	1	--	60
230.....	3	18	38	9	--	--	2	--	70
232.....	5	14	23	7	3	--	5	--	57
234.....	2	11	21	5	2	1	1	--	43
236.....	1	12	6	6	1	--	--	1	27
238.....	1	4	8	2	--	--	--	--	15
240.....	--	5	2	1	--	1	1	--	10
242.....	1	1	1	--	--	--	--	--	3
244.....	--	--	--	1	--	--	--	--	1
246.....	--	--	--	--	--	--	--	--	--
248.....	--	--	--	--	--	--	--	--	--
250.....	--	--	--	--	--	--	--	--	--
252.....	--	--	1	--	--	--	--	--	--
254.....	--	--	--	--	--	--	--	--	1
Totals.....	46	189	278	74	12	5	18	1	623
Mean lengths..	224	224	226	227	229	230	227	236	225

TABLE 2

Calendar Dates of Lunar Months for the 1956-57 Season

Lunar months	Lunar month (number)	Dates
"August".....	455	July 23-August 20 ¹
"September".....	456	August 21-September 18
"October".....	457	September 19-October 18
"November".....	458	October 19-November 16
"December".....	459	November 17-December 16
"January".....	460	December 17-January 15
"February".....	461	January 16-February 14 ²

¹ Central California season from August 1st through January 15th.² Southern California season from October 1st through February 1st.

TABLE 3
Age (Year Class) Composition of the Sardine Catch in the 1956-57 Season
(Numbers of fish are given in thousands, i.e., 000 omitted)

	Catch		Number of fish by age and year class								
	Tons	Nos.	1 1955	2 1954	3 1953	4 1952	5 1951	6 1950	7 1949	8 1948	9 1947
Central California ¹	62	361	---	28	133	148	37	3	---	12	---
Southern California ²											
"October"	22,415	130,657	---	10,060	48,082	53,831	13,327	784	---	4,573	---
"November"	6,275	36,613	---	2,739	11,017	16,593	3,951	890	157	1,336	---
"December"	3,023	17,257	---	878	4,367	8,568	1,736	407	438	283	---
"January"	353	2,076	---	283	782	947	390	66	42	66	---
"February"	520	2,870	---	409	782	1,162	273	129	---	43	72
Totals Southern California	32,586	189,473	---	14,369	65,090	81,061	19,667	2,276	637	6,301	72
Totals California	32,648	189,834	---	14,397	65,223	81,209	19,704	2,279	637	6,313	72
Baja California ³											
"October"	2,303	13,424	---	1,034	4,040	5,530	1,369	81	---	470	---
"November"	1,861	10,907	---	816	3,282	4,922	1,177	265	47	398	---
"December"	1,490	8,506	---	433	2,428	4,238	851	201	216	139	---
"January"	67	394	---	54	154	178	74	13	8	13	---
"February"	250	1,380	---	197	376	558	131	62	---	21	35
Totals Baja California	5,971	34,611	---	2,534	11,080	15,426	3,602	622	271	1,041	35
Grand totals	38,619	224,445	---	16,931	76,303	96,635	23,305	2,901	908	7,354	107
Percent of total	---	100.0	---	7.5	34.0	43.1	10.3	1.3	0.4	3.3	0.1

¹ Includes landings from "August" and "September" only; aged with data taken in Southern California during the first week of "October."

² Sampled at San Pedro and Port Hueneme. Previously reported as San Pedro.

³ Sampled at Ensenada. Numbers of fish and age composition obtained based on Southern California age data taken during the same time period. Limited Ensenada samples were considered insufficient for aging.

AGE COMPOSITION OF THE SOUTHERN CALIFORNIA CATCH OF PACIFIC MACKEREL FOR THE TWO SEASONS, 1955-56 AND 1956-57

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This is the sixth report on the age composition of the Pacific mackerel, *Pneumatophorus diego*, catch. The methods of sampling, age determination and estimation of numbers of fish are the same as those used in previous reports which covered the period 1939-40 through 1954-55. The catch of 26,756,000 pounds during 1955-56 was almost identical to the 1954-55 catch which was poorer than any season from 1933-34 through 1951-52. The 57,128,000 pounds landed in 1956-57, while more than double the 1955-56 catch, were below the average over the past 25 years.

Lengths for the 572 and 1,011 mackerel from which otoliths were read during the 1955-56 and 1956-57 seasons ranged from 82 to 170 quarter centimeters (205 to 425 mm). These fish ranged in age from zero through nine in 1955-56 (Table 1) and from zero through five in 1956-57 (Table 2). None of the fish caught during 1955-56 had hatched prior to 1946, and in the 1956-57 season no fish sampled was older than five years. The 1956-57 season was the first on record in which the entire catch was made up of fish younger than six years of age.

Of the total season's take in 1955-56—35,321,000 fish (Table 3)—nearly 60 percent, 21 million, were from the 1953 year class. This year class already had furnished 89 percent of the 1954-55 catch as one-year-olds, and 82 percent of the 1953-54 catch as zeros. In 1956-57, however, the 14,641,000 fish from the 1953 hatch comprised but 17.7 percent of the catch. On the other hand, the 1955 year class furnished yearly 60 percent of the catch that season when 82,770,000 fish were taken (Table 3).

During the first 48 months of existence, the 1953 year class has contributed 88,070,000 fish—the fourth greatest number of fish since the 1938 hatch (Table 4). The 1955 year class, after only 24 months of existence, already ranks seventh in importance among the 18 year classes for which data are available. It is not likely that either the 1953 or the 1955 year class will yield a greater number of fish than did the 1938, 1941, and 1947 year classes. The 1956 year class gives every indication of being quite poor.

The dependency of the current fishery upon incoming year classes is reflected in the fact that although the 1939 year class furnished 16.4 million fewer fish in six years than has the 1953 year class in five (Table 4), the 71.6 million 1939's weighed but 0.8 million pounds less than the 88.1 million 1953's (Table 5).

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- 1955. Age composition of the southern California catch of Pacific mackerel for the 1953-54 season. Calif. Fish and Game, vol. 41, no. 1, p. 107-112.
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TABLE 1

Fork Length of Pacific Mackerel in Quarter Centimeters at Each Age
for the 1955-56 Season, Based on Otoliths Read

$\frac{1}{4}$ cm.	Age group									
	0	I	II	III	IV	V	VI	VII	VIII	IX
82	1	--	--	--	--	--	--	--	--	--
3	1	--	--	--	--	--	--	--	--	--
4	1	--	--	--	--	--	--	--	--	--
85	6	--	--	--	--	--	--	--	--	--
6	7	--	--	--	--	--	--	--	--	--
7	1	1	--	--	--	--	--	--	--	--
8	4	--	--	--	--	--	--	--	--	--
9	7	--	--	--	--	--	--	--	--	--
90	15	--	--	--	--	--	--	--	--	--
1	10	--	--	--	--	--	--	--	--	--
2	9	--	--	--	--	--	--	--	--	--
3	3	--	--	--	--	--	--	--	--	--
4	12	--	--	--	--	--	--	--	--	--
95	7	--	--	--	--	--	--	--	--	--
6	10	--	--	--	--	--	--	--	--	--
7	3	1	--	--	--	--	--	--	--	--
8	11	1	--	--	--	--	--	--	--	--
9	6	1	--	--	--	--	--	--	--	--
100	3	2	--	--	--	--	--	--	--	--
1	2	2	--	--	--	--	--	--	--	--
2	4	5	--	--	--	--	--	--	--	--
3	--	4	--	--	--	--	--	--	--	--
4	--	4	--	--	--	--	--	--	--	--
105	--	8	--	--	--	--	--	--	--	--
6	--	3	--	--	--	--	--	--	--	--
7	--	12	--	--	--	--	--	--	--	--
8	--	7	1	--	--	--	--	--	--	--
9	--	8	2	--	--	--	--	--	--	--
110	--	13	3	--	--	--	--	--	--	--
1	--	8	3	--	--	--	--	--	--	--
2	--	11	2	--	--	--	--	--	--	--
3	--	9	3	--	--	--	--	--	--	--
4	--	6	7	--	--	--	--	--	--	--
115	--	14	5	--	--	--	--	--	--	--
6	--	4	3	--	--	--	--	--	--	--
7	--	6	2	--	--	--	--	--	--	--
8	--	6	10	--	--	--	--	--	--	--
9	--	17	17	--	--	--	--	--	--	--
120	--	4	19	--	--	--	--	--	--	--
1	--	--	10	--	--	--	--	--	--	--
2	--	1	13	--	--	--	--	--	--	--
3	--	1	12	--	--	--	--	--	--	--
4	--	--	14	--	--	--	--	--	--	--
125	--	--	15	--	--	--	--	--	--	--
6	--	--	18	2	--	--	--	--	--	--
7	--	--	13	--	--	--	--	--	--	--
8	--	--	9	3	--	--	--	--	--	--
9	--	--	7	4	--	--	--	--	--	--
130	--	--	3	4	--	--	--	--	--	--
1	--	--	4	10	--	--	--	--	--	--
2	--	--	5	9	--	--	--	--	--	--
3	--	--	--	15	--	--	--	--	--	--
4	--	--	1	6	--	--	--	--	--	--
135	--	--	--	5	--	--	--	--	--	--
6	--	--	--	8	--	--	--	--	--	--
7	--	--	--	7	2	--	--	--	--	--
8	--	--	--	7	1	--	--	--	--	--
9	--	--	--	1	1	--	--	--	--	--
140	--	--	--	2	1	--	--	--	--	--
1	--	--	--	--	1	--	--	--	--	--
2	--	--	--	2	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--
4	--	--	--	1	1	--	--	--	--	--
145	--	--	--	--	--	--	--	--	--	--

TABLE 1—Continued
 Fork Length of Pacific Mackerel in Quarter Centimeters at Each Age
 for the 1955-56 Season, Based on Otoliths Read

$\frac{1}{4}$ cm.	Age group									
	0	I	II	III	IV	V	VI	VII	VIII	IX
6.....	--	--	--	--	--	--	--	--	--	--
7.....	--	--	--	--	1	--	--	--	--	--
8.....	--	--	--	--	1	--	--	--	--	--
9.....	--	--	--	--	--	--	--	--	--	--
150.....	--	--	--	--	--	--	1	--	--	--
1.....	--	--	--	--	--	--	--	--	--	--
2.....	--	--	--	--	--	1	--	--	--	--
3.....	--	--	--	--	--	--	--	--	--	--
4.....	--	--	--	--	--	--	--	1	1	--
155.....	--	--	--	--	--	--	--	--	--	--
6.....	--	--	--	--	--	--	1	--	--	--
7.....	--	--	--	--	--	--	--	--	--	--
8.....	--	--	--	--	--	--	--	--	--	--
9.....	--	--	--	--	--	--	--	--	--	--
160.....	--	--	--	--	--	--	--	--	--	--
1.....	--	--	--	--	--	--	--	--	--	1
2.....	--	--	--	--	--	--	--	--	--	--
3.....	--	--	--	--	--	--	--	--	1	--
4.....	--	--	--	--	--	--	--	--	--	--
165.....	--	--	--	--	--	--	--	--	--	--
6.....	--	--	--	--	--	--	--	1	--	--
7.....	--	--	--	--	--	--	--	--	--	--
8.....	--	--	--	--	--	--	--	--	--	--
9.....	--	--	--	--	--	--	--	--	--	--
170.....	--	--	--	--	--	--	--	--	1	--
Totals.....	125	142	201	86	9	1	2	2	3	1

TABLE 2

Fork Length of Pacific Mackerel in Quarter Centimeters at Each Age
for the 1956-57 Season, Based on Otoliths Read

$\frac{1}{4}$ cm.	Age group					
	0	I	II	III	IV	V
81	--	--	--	--	--	--
2	--	--	--	--	--	--
3	1	--	--	--	--	--
4	--	--	--	--	--	--
85	--	--	--	--	--	--
6	--	--	--	--	--	--
7	1	--	--	--	--	--
8	1	--	--	--	--	--
9	1	1	--	--	--	--
90	--	2	--	--	--	--
1	--	1	--	--	--	--
2	--	3	--	--	--	--
3	--	1	--	--	--	--
4	--	6	--	--	--	--
95	--	6	--	--	--	--
6	--	--	--	--	--	--
7	--	9	--	--	--	--
8	--	6	--	--	--	--
9	--	10	--	--	--	--
100	--	21	--	--	--	--
1	--	13	--	--	--	--
2	--	14	--	--	--	--
3	--	16	--	--	--	--
4	--	22	--	--	--	--
105	--	33	--	--	--	--
6	--	24	--	--	--	--
7	--	21	--	--	--	--
8	--	23	--	--	--	--
9	--	31	--	--	--	--
110	--	25	--	--	--	--
1	--	23	1	--	--	--
2	--	22	2	--	--	--
3	--	26	2	--	--	--
4	--	31	--	--	--	--
115	--	17	2	--	--	--
6	--	18	6	--	--	--
7	--	20	5	--	--	--
8	--	21	9	--	--	--
9	--	15	15	--	--	--
120	--	9	8	--	--	--
1	--	12	14	2	--	--
2	--	10	20	1	--	--
3	--	1	15	--	--	--
4	--	5	21	2	--	--
125	--	5	12	2	--	--
6	--	--	26	--	--	--
7	--	--	11	2	--	--
8	--	--	16	6	--	--
9	--	--	7	10	--	--
130	--	--	10	14	--	--
1	--	--	6	14	--	--
2	--	--	4	14	--	--
3	--	--	2	13	1	--
4	--	--	1	24	1	--
135	--	--	1	14	1	--
6	--	--	--	18	2	--
7	--	--	--	13	2	--
8	--	--	--	8	8	--
9	--	--	--	10	3	--
140	--	--	--	5	8	--
1	--	--	--	3	13	--
2	--	--	--	6	9	--
3	--	--	--	1	7	--
4	--	--	--	--	5	--
145	--	--	--	--	3	--

TABLE 2—Continued

Fork Length of Pacific Mackerel in Quarter Centimeters at Each Age
for the 1956-57 Season, Based on Otoliths Read

$\frac{1}{4}$ cm.	Age group					
	0	I	II	III	IV	V
6. ---	-	--		--	11	--
7. ---	--	--		--	2	--
8. ---	--	--		--	5	1
9. ---	--				--	--
150. ---	--				--	--
1. ---	--				2	
2. ---					--	
3. ---					--	1
4. ---		--	--	--	1	--
155. ---	--	--	--	--	--	--
6. ---	--	--	--	--	--	1
Totals	4	523	215	182	84	3

TABLE 3
Calculated Number of Pacific Mackerel Landed for Age Groups
0 Through VI+ for the 1955-56 and 1956-57 Season

	Age group						
	0	I	II	III	IV	V	VI+
Totals							
1955-56 season							
Year class	1955	1954	1953	1952	1951	1950	---
Number of fish	4,237,000	3,562,000	21,156,000	6,020,000	204,000	15,000	127,000
Percentage of fish	12.0	10.1	59.9	17.0	0.6	0.0	0.4
1956-57 season							
Year class	1956	1955	1954	1953	1952	1951	---
Number of fish	21,000	49,429,000	14,976,000	14,641,000	3,641,000	62,000	0
Percentage of fish	0.0	59.7	18.1	17.7	4.4	0.1	0.0

TABLE 4

Number of Fish Landed by Year Class at Each Age Group
from 0 Through V, 1939-40 Through 1956-57

Year class	Age group						Totals
	0	I	II	III	IV	V	
1934	----	----	----	----	----	5,340,000	----
1935	----	----	----	----	10,570,000	1,443,000	----
1936	----	----	----	35,130,000	13,551,000	970,000	----
1937	----	----	26,540,000	25,261,000	5,121,000	822,000	----
1938	----	25,200,000	69,322,000	25,661,000	5,271,000	1,082,000	*126,536,000
1939	2,960,000	20,793,000	26,454,000	12,698,000	7,133,000	1,616,000	71,654,000
1940	2,313,000	12,507,000	9,204,000	10,156,000	7,712,000	3,328,000	45,220,000
1941	398,000	29,376,000	54,106,000	33,905,000	10,312,000	2,294,000	130,391,000
1942	0	12,462,000	19,047,000	10,259,000	4,661,000	2,019,000	48,448,000
1943	836,000	16,556,000	10,327,000	11,872,000	5,087,000	429,000	45,107,000
1944	0	14,302,000	25,823,000	10,943,000	1,105,000	584,000	52,757,000
1945	556,000	9,330,000	7,980,000	756,000	688,000	72,000	19,382,000
1946	560,000	1,377,000	3,175,000	4,279,000	937,000	218,000	10,546,000
1947	7,181,000	63,330,000	49,255,000	15,826,000	11,127,000	2,756,000	149,475,000
1948	1,061,000	21,818,000	19,228,000	13,871,000	9,484,000	367,000	65,829,000
1949	136,000	3,854,000	4,428,000	1,286,000	161,000	0	9,865,000
1950	6,000	1,583,000	521,000	583,000	71,000	15,000	2,779,000
1951	769,000	46,000	475,000	208,000	204,000	62,000	1,764,000
1952	86,000	676,000	3,893,000	6,021,000	3,641,000	----	14,317,000
1953	12,237,000	40,036,000	21,156,000	14,641,000	----	----	88,070,000
1954	564,000	3,562,000	14,976,000	----	----	----	19,102,000
1955	4,237,000	49,429,000	----	----	----	----	53,666,000
1956	21,000	----	----	----	----	----	----

* No information available on the 0 age group of the 1938 year class.

TABLE 5

Pounds of Fish Landed by Year Class at Each Age Group
0 Through V, 1939-40 Through 1956-57

Year class	Age group						Totals
	0	I	II	III	IV	V	
1934	----	----	----	----	----	6,851,000	----
1935	----	----	----	----	12,141,000	1,885,000	----
1936	----	----	----	31,946,000	14,592,000	1,414,000	----
1937	----	----	19,306,000	22,163,000	7,015,000	1,178,000	----
1938	----	11,578,000	49,762,000	27,249,000	6,651,000	1,499,000	*96,739,000
1939	961,000	11,609,000	21,747,000	12,898,000	9,058,000	2,334,000	58,607,000
1940	853,000	7,564,000	7,809,000	10,743,000	10,139,000	4,809,000	41,917,000
1941	116,000	15,085,000	40,066,000	36,527,000	13,595,000	3,236,000	108,625,000
1942	0	7,912,000	16,208,000	11,453,000	6,225,000	2,863,000	44,661,000
1943	274,000	9,991,000	9,221,000	12,786,000	6,718,000	638,000	39,628,000
1944	0	7,296,000	22,530,000	13,035,000	1,484,000	852,000	45,197,000
1945	158,000	5,627,000	7,601,000	867,000	899,000	100,000	15,252,000
1946	129,000	1,015,000	2,365,000	4,070,000	1,078,000	290,000	8,947,000
1947	1,477,000	29,643,000	32,320,000	14,692,000	12,819,000	4,058,000	95,009,000
1948	248,000	8,612,000	13,591,000	13,327,000	12,583,000	637,000	48,998,000
1949	47,000	2,155,000	3,547,000	1,509,000	229,000	0	7,487,000
1950	1,000	802,000	474,000	687,000	90,000	24,000	2,078,000
1951	252,000	34,000	483,000	234,000	244,000	94,000	1,341,000
1952	33,000	463,000	3,063,000	6,034,000	4,394,000	----	13,987,000
1953	4,358,000	23,175,000	16,990,000	14,973,000	----	----	59,496,000
1954	94,000	1,964,000	11,722,000	----	----	----	13,780,000
1955	1,270,000	25,940,000	----	----	----	----	27,210,000
1956	5,000	----	----	----	----	----	----

* No information available on the 0 age group of the 1938 year class.

AGE AND LENGTH COMPOSITION OF THE NORTHERN ANCHOVY CATCH OFF THE COAST OF CALIFORNIA IN 1954-55, 1955-56, AND 1956-57

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This report on age and length composition of the commercial and live bait catch of northern anchovy (*Engraulis mordax*) off the coast of California is a continuation of a series in which similar data have been published on the commercial catch for the 1952-53 and 1953-54 seasons (Miller et al., 1955).

Inclusion of age and length composition of the live bait catch has necessitated a change from previous presentation of anchovy age and length data. Live bait samples were collected at eight ports in the 1955-56 season and at nine ports in the 1956-57 season. Additional ports are scheduled to be sampled in the future. To present anchovy age and length data, as done previously, would result in overburdening the raw data tables. Critical examination of all commercial and live bait catch data revealed that the same information could be presented in far fewer tables if the data were not separated by sexes. However, since past studies of the sex ratio of anchovies by port and season demonstrated considerable variability, a summary of sex ratio data for the 1954-55, 1955-56 and 1956-57 commercial seasons is presented in Table 14.

Anchovy live bait age and length data are summarized by two-month intervals at each port rather than by statistical regions (Miller et al., 1955, Figure 1). Analysis of these data shows strong evidence of seasonal changes in year class composition at a port, and also shows latitudinal differences in the observed anchovy population when data of different ports are compared within the same time interval.

COMMERCIAL CATCH

Under commercial catch are included fish used in canning for both human consumption and pet food; fresh, frozen, and salted fish sold at fresh fish markets; dead bait used by both sportsmen and commercial fishermen; fish used for feeding at fish hatcheries and mink farms; and offal used for reduction into meal and oil.

The age and length composition of the commercial catch of anchovies landed in the Eureka, San Francisco, and San Diego regions are not included in this paper. The landings in these regions were: Eureka, 1954-55 season, 1 ton; San Francisco, 1954-55 season, 130 tons, 1955-56 season, 103 tons, 1956-57 season, 194 tons; San Diego, 1954-55 season, 1 ton, 1955-56 season, 3 tons, 1956-57 season, 1 ton.

In the Monterey region, including the Ports of Santa Cruz, Moss Landing, and Monterey, the catch in 1954-55 was limited because of a scarcity of anchovies. Of the 708 tons delivered, 575 were landed during February and March 1955. These were mostly fish of the 1954 year class (Tables 1 and 4); 54 percent of the season's catch consisted of fish of this year class (0-age group). In the 1955-56 season fishing activity increased, but during most of this period catches were limited due to market conditions. In this season, 82 percent of the catch consisted of fish of the 1954 year class. By March 1956, anchovies had become scarce again; small fish (1955 year class, 0-age group) made up 26 percent of the total catch in that month (Table 9). In the 1956-57 season the catch was again limited by a scarcity of fish. The 1954 year class (two-year-old fish) continued to dominate the catch, making up 74 percent of the total catch by numbers (Table 12). The weak 1955 year class contributed only 10 percent of the season's catch. The 1956 year class (0-age group) appeared stronger than the 1955 year class and contributed 45 percent of the catch in October-November and 30 percent in February and March. In total numbers, however, the 1956 year class also appears to be weak, as the catch remained at a low level because of a scarcity of fish during the early spring months of 1957.

In Southern California (comprising the Santa Barbara and Los Angeles regions), an increasingly greater percentage of the total catch has been landed in the Los Angeles region since the 1953-54 season. In this region, which includes the Ports of Santa Monica, San Pedro, Wilmington, Long Beach, and Newport Beach, 16,014 tons were landed in 1954-55, 17,871 tons in 1955-56, and 23,728 tons in 1956-57. In the 1954-55 season as well as in the two preceding seasons, nearly all of the Santa Barbara landings were trucked to processing plants in the Los Angeles, Monterey, and San Francisco regions. Since then, however, the abundance of commercial-sized anchovies has increased in the Los Angeles and Monterey regions and trucking from the Santa Barbara region has become quite limited. The greater part of the Santa Barbara region catch in 1955-56 and 1956-57 was used for dead bait.

In determining the numbers of fish per year class in the Santa Barbara region for the latter two seasons (Tables 8 and 12), the age and length data of the live bait catch were used. Field information disclosed that in this region fishing for dead bait and live bait was undertaken in the same areas and, occasionally, by the same vessels. Samples of commercial anchovies were not collected in the Los Angeles region from July through October in the 1955-56 season. Thus, age and length data necessary to compute the number of fish by year class for this period in the Los Angeles region were derived from samples taken from the live bait catch. A comparison of previous commercial and live bait sampling in the Los Angeles region indicated that data derived from the live bait catch could be used, when necessary, in lieu of commercial samples.

Throughout the past three seasons the commercial catch of anchovies in Southern California has not been limited by lack of fish. Most noteworthy has been the high recruitment of young fish into the Southern California area year after year. In the 1954-55 season, 0, I, and II age group fish made up 93.1 percent of the total catch, with the dominant age group, the 1953 year class, making up 52.9 percent of the total

(Table 5). Again, in the 1955-56 season, 90 percent of the catch was of 0, I, and II age group fish, of which the dominant 1954 year class made up 49.5 percent (Table 9). In the 1956-57 season the strong 1954 year class (at two years of age) continued to dominate the population in Southern California. In this season, the first three age groups made up 82.0 percent of the total (Table 13). Over the past three seasons the anchovy fishery has been dependent upon the incoming year classes, and no age group has contributed materially to more than three seasons' catch.

The age and length compositions of anchovy samples from the commercial catch have been summarized in two-month intervals by region for the three seasons in the following tables:

Anchovy—Commercial Catch, 1954-55 Season

Table 1—Age and length composition at Monterey

Table 2—Age and length composition at Santa Barbara

Table 3—Age and length composition at Los Angeles

Table 4—Age composition (in numbers of fish) of anchovy catch

Table 5—Percentage composition and mean lengths of fish by age and year class

Anchovy—Commercial Catch, 1955-56 Season

Table 6—Age and length composition at Monterey

Table 7—Age and length composition at Los Angeles

Table 8—Age composition (in numbers of fish) of anchovy catch

Table 9—Percentage composition and mean lengths of fish by age and year class

Anchovy—Commercial Catch, 1956-57 Season

Table 10—Age and length composition at Monterey

Table 11—Age and length composition at Los Angeles

Table 12—Age composition (in numbers of fish) of anchovy catch

Table 13—Percentage composition and mean lengths of fish by age and year class

Anchovy—Commercial Catch, 1954-55 Through 1956-57 Seasons

Table 14—Sex ratios in number and percent of fish measured

LIVE BAIT CATCH

The live bait catch includes only anchovies used for live bait. Live bait is used on party boats, by skiff fishermen, pier fishermen, and occasionally by local commercial albacore fishermen. This fishery is restricted to Southern California and the Morro Bay-Avila area of central California. The live bait catch over the past two seasons has consisted primarily of northern anchovies. This fish made up 97.0 percent of the live bait in 1955-56 and 99.0 percent in the 1956-57 season. Species occurring in minor amounts in the live bait catch include: Pacific sardine (*Sardinops caerulea*), queenfish (*Seriphus politus*), white croaker (*Genyonemus lineatus*), Pacific herring (*Clupea pallasi*), deepbody anchovy (*Anchoa compressa*), California pompano (*Palometa simillima*), members of the surfperch family (Embiotocidae), and members of the silversides family (Atherinidae). None of these constituted as much as one percent of the catch in these seasons.

The live bait catch figures are compiled from data submitted by each live bait distributor. The number of scoops of live bait delivered each day by each distributor supplying bait to sport boats and bait

receivers is reported. Average scoop weights by port have been determined by biologists of the California Department of Fish and Game, and were found to range in weight from 4.4 pounds at Morro Bay to 20 pounds at San Diego. The total poundage and numbers of fish caught are computed from data supplied by the fishermen and from data derived from samples of live bait collected at most of the ports. The live bait dealers are co-operating in this study by setting aside, for our use, one random scoop of bait per week during the period April 1 through October 31. Over 90 percent of the live bait catch is taken within this period. Because of the small take of live bait and the resulting difficulties in obtaining samples during November through March, no data are available for these months. In computing the numbers of fish per year class in these months (Tables 23 and 34), age and length data of October and April-May periods are used.

The sample scoops of bait are kept frozen by the live bait dealers and are collected periodically by department biologists. The weight and species composition of each scoop is recorded and a random sample of 50 anchovies (and sardines, if present) is measured. During the 1955-56 season, scale samples were taken from 10 anchovies picked at random from each 50-fish sample. Because of the wide range in size of fish in some samples and the considerable overlap in sizes of the older age groups, a reliable age composition of this season's catch may not have been obtained, especially in instances where one or two samples represented an entire month's catch at a given point. Upon examination of the 1955-56 data it was evident that a change in the scale collection method was needed. In the 1956-57 season, scales were collected from one fish per centimeter length group and the importance of saving at least four samples per month at each port was pointed out to live bait dealers.

In the 1955-56 season, the 1954 year class was the dominant age group at all ports except San Diego, where the 1953 year class remained dominant throughout the season. Differences in size and age composition were noted during the season at all ports of landing (Table 24), indicating changes in the anchovy population within each area during the season. The seasonal change in year class strength at Santa Barbara is most striking. In April and May the catch was entirely of the 1954 year class. In subsequent months the average age rose until, by October, there were about equal numbers of fish of the 1954 and 1953 classes, with small numbers of the 1952 and 1955 classes also present. In this season, the ports of San Pedro and San Diego, with 2,329 and 1,996 tons, respectively, accounted for 72 percent of the total California live bait catch of 6,024 tons (Table 23). The catches at the ports of Newport Beach and Santa Monica together contributed 18 percent to the total. The totals for Santa Monica include the catches reported at Malibu and Redondo, and the totals for San Pedro include the catches reported at Long Beach. The total season's catch of 16 tons at Morro Bay was not included in the 1955-56 tables.

In the 1956-57 season, the age composition of the bait catch off southern California differed markedly from that of the preceding season. From Santa Barbara to Newport Beach, the 1954 year class (two-year-old fish) was the dominant age group, but from San Clemente

south to San Diego the 1955 year class was taken in greater numbers. It is noteworthy that at San Diego the 1953 class, which was dominant throughout the 1955-56 season, was considerably reduced in the 1956-57 season, contributing only 4.9 percent of the season's total (Table 35). As in the preceding season, the main concentration of fishing activity for live bait was at the ports of San Diego and San Pedro. The totals for Santa Monica include the catches reported at Redondo, and the total for San Pedro includes the catches reported at Long Beach. The total season's catch of 10 tons at Morro Bay was not included in the 1956-57 tables due to inadequate sampling at this port. Catches made in the period January 1 through March 31, 1957, have not been included in this report. These catches are small, totaling 371 tons for all ports combined.

The age and length compositions of anchovy samples from the live bait catch have been summarized by two-month intervals at each port for the 1955-56 and 1956-57 seasons, as follows:

Anchovy—Live Bait Catch, 1955-56 Season

- Table 15—Age and length composition at Santa Barbara
- Table 16—Age and length composition at Port Hueneme
- Table 17—Age and length composition at Santa Monica
- Table 18—Age and length composition at San Pedro
- Table 19—Age and length composition at Newport
- Table 20—Age and length composition at San Clemente
- Table 21—Age and length composition at Oceanside
- Table 22—Age and length composition at San Diego
- Table 23—Age composition (in numbers of fish) of anchovy catch
- Table 24—Percentage composition and mean lengths of fish by age and year class

Anchovy—Live Bait Catch, 1956-57 Season

- Table 25—Age and length composition at Santa Barbara
- Table 26—Age and length composition at Port Hueneme
- Table 27—Age and length composition at Malibu
- Table 28—Age and length composition at Santa Monica
- Table 29—Age and length composition at San Pedro
- Table 30—Age and length composition at Newport
- Table 31—Age and length composition at San Clemente
- Table 32—Age and length composition at Oceanside
- Table 33—Age and length composition at San Diego
- Table 34—Age composition (in numbers of fish) of anchovy catch
- Table 35—Percentage composition and mean lengths of fish by age and year class

Two summary tables have been prepared, giving the age composition of the combined commercial and live bait catches for the 1955-56 and 1956-57 seasons:

- Table 36—Age composition of the combined commercial and live bait catches for the 1955-56 season
- Table 37—Age composition of the combined commercial and live bait catches for the 1956-57 season

ACKNOWLEDGMENTS

The authors take pleasure in acknowledging the help given by a number of other workers, especially to Anita E. Daugherty of the Marine Resources Operations of the California Department of Fish and Game, and to Frances E. Felin and John S. MacGregor of the Bureau of Commercial Fisheries of the U. S. Fish and Wildlife Service for help in age determinations. Charles H. Turner and George

Reiner of the Marine Resources Operations of the California Department of Fish and Game were responsible for the collection of live bait samples.

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TABLE 1

Anchovy—Commercial Catch, 1954-55 Season
 Age and Length Composition, Summaried by Two-Month Intervals

MONTEREY

Time interval ¹	April-May						February-March						Season total						
Year class....	53	52	51	50	49		54	53	52	51	50		54	53	52	51	50	49	
No. of rings....	1	2	3	4	5	T ²	0	1	2	3	4	T	0	1	2	3	4	5	T
Standard length mm.																			
106.....							1					1	1						1
108.....																			
110.....							2					2	2						2
112.....							1					1	1						1
114.....							2					2	2						2
116.....							3					3	3						3
118.....							2					2	2						2
120.....							4					4	4						4
122.....							2					2	2						2
124.....	1					1	5					5	5						5
126.....							5					5	5						5
128.....	1	1				2	5					5	5	1	1				7
130.....	1	1				2	5					5	5	1	1				7
132.....							5					5	5						5
134.....				1		1	2		1			3	2			1			4
136.....		2				2								2					2
138.....			1	1		2		1				1		1		1	1		3
140.....								2				2		2					2
142.....				1		1											1		1
144.....																			
146.....			1	1		2			1			1			1	1	1		3
148.....			1	2		3				1		1				2	2		4
150.....			1	1		2										1	1		2
152.....				2	1	3											2	1	3
154.....																			
156.....										1		1				1			1
158.....				2		2					1	1					3		3
160.....			1			1										1			1
168.....				1		1											1		1
Totals.....	3	4	5	12	1	25	41	3	2	2	1	52	44	6	6	7	13	1	77

¹ Months during which no samples were obtained are omitted from this and succeeding tables.² T—total.

TABLE 2
Anchovy—Commercial Catch, 1954-55 Season
Age and Length Composition, Summarized by Two-Month Intervals
 SANTA BARBARA

Time interval	April-May				June-July				August-September				October				December				Season total								
Year class	53	52	51	T	53	52	51	50	53	52	51	50	53	52	51	50	54	53	52	51	54	53	52	51	50				
No. of rings	1	2	3	T	1	2	3	4	1	2	3	4	T	1	2	3	T	0	1	2	3	T	0	1	2	3	4	T	
Standard length mm.																													
110	1			1																		1					1		
112	2			2																							2		
114	2			2																							2		
116	1			1														1									1		
118	2			2																							2		
120	2			2																							2		
122	1			1																							1		
124																													
126																													
128	1	1		2					5																		6		
130	2	1	1	4					2	1	1																7		
132									1	1	4																6		
134									1	1	1																3		
136									1	1	1																3		
138									1	1	1																3		
140									2	2	2																6		
142									1	1	1																3		
144									2	2	2																6		
146									1	1	1																3		
148									2	2	2																5		
150									1	1	1																3		
152									1	1	1																7		
154									1	1	1																10		
156									2	2	2																13		
162									1	1	1																10		
Totals	13	7	10	30	1	12	7	1	21	14	22	2	1	39	5	1	2	8	1	13	5	1	20	1	46	47	22	2	118

TABLE 3
Anchovy—Commercial Catch, 1954-55 Season
Age and Length Composition, Summarized by Two-Month Intervals
LOS ANGELES

Time interval.....	April-May					June-July					August					October-November					Dec.-Jan.		February-March					Season total				
	53 52 51 50 49					54 53 52 51 50					54 53 52 51 50					54 53 52 51					53 52		54 53 52 51 50					54 53 52 51 50 49				
	1	2	3	4	5	T	0	1	2	3	4	T	0	1	2	3	4	T	0	1	2	3	4	T	0	1	2	3	4	5	T	
No. of rings																																
Standard length mm.																																
74																																
76																																
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164																																
Totals	37	28	9	3	1	78	1	37	16	5	1	60	10	37	8	0	1	56	11	12	14	1	38	41	11	52	28	26	12	0	1	47

TABLE 4
Age (Year Class) Composition of the Anchovy Commercial Catch in the 1954-55 Season
(Numbers of fish are given in thousands, i.e., 000 omitted)

Catch		Number of fish by age and year class					
Tons	Nos.	0	1	2	3	4	5
		1954	1953	1952	1951	1950	1949
Monterey							
April-May	69	--	287	391	351	859	64
June-July	29	--	120	163	148	358	26
August-September	3	--	102	4	3	3	1
October-November	32	1,098	49	36	28	4	--
December-January	575	19,855	879	659	505	66	--
February-March							--
Totals Monterey	708	20,953	1,437	1,253	1,035	1,290	91
Totals Central California							
	708	20,953	1,437	1,253	1,035	1,290	91
Santa Barbara							
April-May	1,242	--	22,229	11,115	11,115	1,302	--
June-July	1,004	--	22,076	29,772	7,482	2,671	--
August-September	3,292	4,006	36,060	63,662	4,897	--	--
October-November	1,187	3,320	25,728	5,809	6,639	--	--
December-January	854	2,164	21,634	5,872	1,236	--	--
February-March	123	313	3,129	850	179	--	--
Totals Santa Barbara	7,702	9,803	109,756	110,080	31,548	3,973	--
Los Angeles							
April-May	2,782		50,481	43,898	10,974	3,292	1,097
June-July	1,530	262	39,309	20,178	4,455	1,310	--
August-September	2,192	6,201	81,850	14,055	1,240	--	--
October-November	1,137	6,500	17,110	17,685	2,918	--	--
December-January	3,237	1,123	90,649	20,556	--	--	--
February-March	5,136	71,216	81,228	35,891	--	567	--
Totals Los Angeles	16,014	85,302	360,627	152,263	18,347	6,409	1,097
Totals Southern California							
	23,716	95,105	470,383	262,343	49,895	10,382	1,097
Grand Totals California	24,424	116,058	471,820	263,596	50,930	11,672	1,188

TABLE 5

Anchovy Commercial Catch, 1954-55 Season
Percentage Composition and Mean Length of Fish by Age and Year Class Summarized for Each Port by Two-Month Intervals

	Percentage composition by age and year class						Mean length by age and year class						No. fish aged
	0		1		2		3		4		5		
	1954	1953	1952	1951	1950	1949	1954	1953	1952	1951	1950	1949	
Monterey													
April-May		14.7	20.0	18.0	44.0	3.3							
February-March	90.4	4.0	3.0	2.3	0.3	--	124	125	132	148	150	152	25
Season Monterey	80.4	5.5	4.8	4.0	5.0	0.3	124	132	134	149	150	152	52
Season Central California	80.4	5.5	4.8	4.0	5.0	0.3	124	132	134	149	150	152	77
Santa Barbara													
April-May		50.0	25.0	25.0	4.0	--	--	121	142	150	154	136	30
June-July		3.0	70.0	23.0	4.0	--	--	124	143	149	154	145	21
August-September	3.6	32.4	57.2	4.4	2.4	--	--	132	141	148	148	138	39
October	8.0	62.0	14.0	16.0	--	--	--	130	146	149	--	137	8
December	7.0	70.0	19.0	4.0	--	--	116	137	142	146	--	138	20
Season Santa Barbara	3.7	41.3	41.6	11.9	1.5	--	116	130	142	149	151	139	118
Los Angeles													
April-May		46.0	40.0	10.0	3.0	1.0	--	124	139	149	147	154	78
June-July	0.4	60.0	30.8	6.8	2.0	--	96	122	133	146	142	127	60
August-September	6.0	79.2	13.6	9.0	1.2	--	90	125	134	154	154	120	56
October-November		14.7	38.7	40.0	6.6	--	95	124	147	150	--	125	38
December-January	1.0	80.7	18.3	--	--	--	--	134	150	--	--	137	52
February-March	37.7	43.0	19.0	--	0.3	--	120	141	152	--	164	135	67
Season Los Angeles	13.7	57.8	24.4	2.9	1.0	0.2	108	128	142	148	150	154	351
Season Southern California	10.7	52.9	29.5	5.6	1.2	0.1	109	128	142	148	150	154	469
Season California	12.7	51.6	28.8	5.6	1.2	0.1	--	--	--	--	--	--	--

TABLE 6
 Anchovy—Commercial Catch, 1955-56 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 MONTEREY

Time interval	April-May					June-July					Aug.-Sept.		November			March			Season total													
	54	53	52	51	50	55	54	53	52	51	50	54	53	52	55	54	53	52	55	54	53	52	51	50								
Year class	1	2	3	4	5	T	0	1	2	3	4	5	T	1	2	T	0	1	2	3	T	0	1	2	3	4	5	T				
No. of rings	1	2	3	4	5	T	1	2	3	4	5	T	1	2	T	0	1	2	3	T	0	1	2	3	4	5	T					
Standard length mm.																																
102	1					1															1						1	1				
104	1					1																1						1	1			
110																																
112																																
114	1					1																										
116	1					1																										
118	6					6																										
120	3					3																										
122	8					8																										
124	3					3																										
126	14					14																										
128	12					12																										
130	12					12																										
132	24					25																										
134	13					17																										
136	19					19																										
138	16					17																										
140	4					4																										
142	13					17																										
144	3					3																										
146	1					1																										
148	1					1																										
150	2					2																										
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166																																
Totals	137	22	9	2	1	171	4	89	7	1	1	1	103	21	3	24	2	14	1	17	10	40	3	1	54	16	301	36	11	3	2	369

TABLE 7
Anchovy—Commercial Catch, 1955-56 Season
Age and Length Composition, Summarized by Two-Month Intervals
LOS ANGELES

TABLE 8
Age (Year Class) Composition of the Anchovy Commercial Catch in the 1955-56 Season
(Numbers of fish are given in thousands, i.e., 000 omitted)

	Catch		Number of fish by age and year class					
	Tons	Nos.	0	1	2	3	4	5
			1955	1954	1953	1952	1951	1950
Monterey								
April-May	1,109	42,602		34,827	5,112	2,079	320	264
June-July	840	23,806	1,102	21,009	1,519	88	60	28
August-September	536	12,146		10,850	1,296	--	--	--
October-November	369	1,156	116	994	46	--	--	--
December-January								
February-March	1,259	43,922	11,275	30,012	2,051	584	--	--
Totals Monterey	4,113	123,632	12,493	97,692	10,024	2,751	380	292
Totals Central California	4,113	123,632	12,493	97,692	10,024	2,751	380	292
Santa Barbara								
April-May	407	18,100		13,830	3,690	580	--	--
June-July	150	6,550	1,080	3,950	960	560	--	--
August-September	240	11,240	1,697	5,845	2,833	865	--	--
October-November	53	1,944	39	739	933	214	19	--
December-January	24	882	18	335	423	97	9	--
February-March	23	738	42	590	91	15	--	--
Totals Santa Barbara	897	39,454	2,876	25,289	8,930	2,331	28	--
Los Angeles								
April-May	5,243	177,842		52,019	96,034	29,789	--	--
June-July	1,879	37,580		19,540	12,030	6,010	--	--
August-September	1,267	51,825	5,753	17,050	24,617	4,405	--	--
October-November	761	31,161	3,459	10,252	14,801	2,649	--	--
December-January	2,586	90,209	3,608	28,416	45,105	13,080	--	--
February-March	6,135	194,832	11,125	155,866	23,945	3,896	--	--
Totals Los Angeles	17,871	583,449	23,945	283,143	216,532	59,829	--	--
Totals Southern California	18,768	622,903	26,821	308,432	225,462	62,160	28	--
Grand Totals California	22,881	746,535	39,314	406,124	235,486	64,911	408	292

TABLE 9

Anchovy Commercial Catch, 1955-56 Season
Percentage Composition and Mean Length of Fish by Age and Year Class Summarized for Each Port by Two-Month Intervals

	Percentage composition by age and year class						Mean length by age and year class						No. fish aged
	0	1	2	3	4	5	0	1	2	3	4	5	
	1955	1954	1953	1952	1951	1950	1955	1954	1953	1952	1951	1950	
Monterey													
April-May		81.8	12.0	4.9	0.7	0.6		130	141	144	159	158	171
June-July	4.6	88.3	6.4	0.4	0.2	0.1	115	134	145	154	160	166	133
August-September		89.3	10.7	--	--	--	--	133	151	--	--	--	135
October-November	10.0	86.0	4.0	--	--	--	122	140	148	--	--	--	135
December-March	25.7	68.3	4.7	1.3	--	--	120	138	144	150	--	--	138
													171
Season Monterey	10.1	79.0	8.1	2.3	0.3	0.2	119	134	143	145	160	162	369
Season Central California	10.1	79.0	8.1	2.3	0.3	0.2	119	134	143	145	160	162	369
Los Angeles													
April-May		29.3	54.0	16.7	--	--	--	128	140	151	--	--	71
June	1.0	66.4	28.4	4.2	--	--	--	130	129	143	--	--	139
December-January	4.0	31.5	50.0	14.5	--	--	116	142	146	144	--	--	132
February-March	5.7	80.0	12.3	2.0	--	--	133	139	157	162	--	--	10
													142
Season Los Angeles	4.1	48.5	37.1	10.3	--	--	124	136	144	150	--	--	40
Season Southern California*	4.3	49.5	36.2	10.0	trace	--	124	136	144	150	--	--	72
Season California	5.3	54.4	31.5	8.7	0.1	trace	--	--	--	--	--	--	193
													193
													--

* Santa Barbara Region not sampled. Age and length data of live bait catch was used in computing the numbers of fish per year class. These data are included in computing the Southern California and California percentages.

TABLE 10
 Anchovy—Commercial Catch, 1956-57 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 MONTEREY

Time interval	April				August				October-November				February				Season total									
	55	54	53	52	54	53	52	51	56	55	54	53	56	55	54	53	52	51								
Year class	1	2	3	4	2	3	4	5	0	1	2	3	0	1	2	3	4	5								
No. of rings	1	2	3	4	2	3	4	5	0	1	2	3	0	1	2	3	4	5								
Standard length mm.	1	2	3	4	2	3	4	5	0	1	2	3	0	1	2	3	4	5								
114									2				2					2								
116																										
118																										
120																										
122																										
124																										
126																										
128																										
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158																										
160																										
162																										
164																										
170																										
172																										
174																										
Totals	3	26	3	1	33	39	9	0	1	49	14	7	14	3	38	1	1	7	1	10	15	11	86	16	1	130

TABLE 11
Anchovy—Commercial Catch, 1956-57 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 LOS ANGELES

Time interval	April-May					June-July					Aug.-Sept.					Oct.-Nov.					December-January					February-March					Season total								
Year class	55	54	53	52		55	54	53	52		55	54	53	52		55	54	53	52		56	55	54	53	52	51	56	55	54	53	52	51							
No. of rings	1	2	3	4	T	1	2	3	4	T	1	2	3	4	T	0	1	2	3	4	5	T	0	1	2	3	4	5	T										
Standard length mm.																																							
108.																						1						1			1								
110																																							
112																																							
114																																							
116																																							
118																																							
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162																																							
164																																							
166																																							
168																																							
Totals	18	60	11	2	91	18	43	8	1	70	11	48	7	66	4	18	18	2	42	3	10	44	15	3	1	76	2	22	72	19	1	116	5	83	285	78	9	1	461

TABLE 12
Age (Year Class) Composition of the Anchovy Commercial Catch in the 1956-57 Season
(Numbers of fish are given in thousands, i.e., 000 omitted)

	Catch		Number of fish by age and year class					
	Tons	Nos.	0 1956	1 1955	2 1954	3 1953	4 1952	5 1951
Monterey								
April-May	2,577	73,975		6,806	59,476	5,622	2,071	
June-July	55	1,577	--	145	1,268	120	44	--
August-September	539	10,587		106	8,554	1,821		106
October-November	400	12,405	5,582	2,233	3,722	868		
December-January	5	180	81	32	54	13		
February-March	33	942	283	75	565	19		
Totals Monterey	3,609	99,666	5,946	9,397	73,639	8,463	2,115	106
Totals Central California	3,609	99,666	5,946	9,397	73,639	8,463	2,115	106
Santa Barbara								
April-May	69	2,928		882	2,005	41		
June-July	56	1,861	--	532	1,001	313	--	--
August-September	124	4,763	254	975	3,468	66	6	--
October-November	1	20	--	1	13	6	--	--
Totals Santa Barbara	250	9,572	263	2,390	6,487	426	6	--
Los Angeles								
April-May	3,559	119,285		23,857	79,518	13,789	2,121	--
June-July	3,376	191,093	--	49,130	117,943	21,988	2,732	--
August-September	3,262	107,884	--	19,419	77,051	11,414		--
October-November	3,244	107,030	1,605	10,168	48,164	43,882	3,211	--
December-January	4,694	150,558	7,317	22,373	88,182	24,917	5,586	2,153
February-March	5,343	167,663	2,431	33,231	110,054	21,313	604	--
Totals Los Angeles	23,478	843,513	11,353	158,178	520,912	136,663	14,254	2,153
Totals Southern California	23,728	853,085	11,616	160,568	527,399	137,089	14,260	2,153
Grand Totals California	27,337	952,751	17,562	169,965	601,038	145,552	16,375	2,259

TABLE 13

Anchovy—Commercial Catch, 1956-57 Season

Percentage Composition and Mean Length of Fish by Age and Year Class Summarized for Each Port by Two-Month Intervals

	Percentage composition by age and year class						Mean length by age and year class						Avg.	No. fish aged
	1956		1955		1954		1953		1952		1951			
	0	1	2	3	4	5	0	1	2	3	4	5		
Monterey														
April	--	9.2	80.4	7.6	2.8	--	--	129	140	147	148	--	140	33
August	--	1.0	80.8	17.2	--	1.0	--	131	154	157	--	174	155	49
October-November	45.0	18.0	30.0	7.0	--	--	123	131	149	149	--	--	136	38
February	30.0	8.0	60.0	2.0	--	--	132	142	150	170	--	--	149	10
Season Monterey	6.0	9.5	73.8	8.5	2.1	0.1	124	132	147	155	148	174	144	130
Season Central California	6.0	9.5	73.8	8.5	2.1	0.1	124	132	147	155	148	174	144	130
Los Angeles														
April-May	--	20.0	66.7	11.6	1.7	--	--	131	139	153	157	--	139	91
June-July	--	25.7	61.7	11.2	1.4	--	--	130	138	145	144	--	137	70
August-September	--	18.0	71.4	10.6	--	--	--	138	141	144	--	--	140	66
October-November	1.5	9.5	45.0	41.0	3.0	--	--	139	139	142	151	--	141	42
December-January	4.8	14.9	58.6	16.6	3.7	1.4	118	137	144	150	152	140	143	76
February-March	1.5	19.8	65.6	12.7	0.4	--	127	138	145	151	164	--	145	116
Season Los Angeles	1.3	18.8	61.8	16.2	1.7	0.2	122	135	141	148	153	140	141	461
Season Southern California	1.4	18.8	61.8	16.1	1.7	0.2	122	135	141	148	153	140	141	461
Season California	1.9	17.8	63.1	15.3	1.7	0.2	--	--	--	--	--	--	--	--

TABLE 14
Anchovy—Commercial Catch
 Sex Ratios, in Number and Percent, of Fish Measured 1954-55, 1955-56 and 1956-57 Seasons

	1954-55 season						1955-56 season						1956-57 season			
	Sex unknown		Male		Female		Sex unknown		Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Monterey																
April-May	--	--	74	49.3	76	51.7	150	0.9	84	49.2	87	50.8	13	37.0	20	63.0
June-July	--	--	--	--	--	--	--	--	53	51.5	49	47.6	18	36.7	31	63.3
August-September	--	--	--	--	--	--	--	--	11	45.4	13	54.6	21	55.5	17	44.5
October-November	--	--	--	--	--	--	--	--	9	53.0	8	47.0	4	40.0	6	60.0
December-January	--	--	--	--	--	--	--	--	30	55.5	24	44.5	56	43.1	74	56.9
February-March	--	--	154	51.3	146	48.7	300	--	--	--	--	--	--	--	--	--
Season Monterey	--	--	228	50.7	222	49.3	450	0.1	187	50.6	181	49.3	369	--	259	56.4
Santa Barbara																
April-May	11	11.0	73	48.7	77	51.3	150	--	--	--	--	--	--	--	--	--
June-July	6	12.0	49	49.0	40	40.0	100	--	--	--	--	--	--	--	--	--
August-September	8	16.0	17	34.0	27	54.0	50	--	--	--	--	--	--	--	--	--
October-November	--	--	20	40.0	22	44.0	50	--	--	--	--	--	--	--	--	--
December-January	--	--	21	42.0	29	58.0	50	--	--	--	--	--	--	--	--	--
February-March	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Season Santa Barbara	25	6.3	180	45.0	195	48.7	400	--	--	--	--	--	--	--	--	--
Los Angeles																
April-May	--	--	219	54.8	181	45.2	400	--	--	--	--	--	--	--	--	--
June-July	17	6.8	116	46.4	134	53.6	250	--	34	47.9	37	52.1	37	40.6	54	59.4
August-September	5	3.3	110	44.4	123	49.2	230	--	5	50.0	5	50.0	32	45.7	38	54.3
October-November	--	--	69	46.0	79	50.7	150	--	--	--	--	--	19	28.8	47	71.2
December-January	--	--	119	47.6	131	52.4	250	--	20	50.0	20	50.0	20	47.5	22	52.4
February-March	--	--	130	43.3	170	56.7	300	--	22	30.5	50	69.5	35	46.1	41	53.9
Season Los Angeles	22	2.4	763	47.7	815	50.9	1,600	--	81	45.0	112	55.0	202	43.6	259	56.4

TABLE 15

Anchovy—Live Bait Catch, 1955-56 Season
Age and Length Composition, Summarized by Two-Month Intervals
 SANTA BARBARA

Time interval	April-May			June-July			August-September			October			Season total				
	54			54			55			55			55	54	53	52	
	1	T		1	2	3	0	1	2	3	0	1	2	3	T		
No. of rings																	
Standard length mm.																	
92.....	1	1												1			1
94.....	1	1												1			1
96.....	1	1												2			2
98.....	2	2												2			2
100.....	2	2												2			2
102.....	3	3												3			3
104.....	3	3												4			4
106.....	4	4												6			6
108.....	3	3		3										6			6
110.....	3	3		2										6			6
112.....	3	3		5										9			9
114.....	3	3		5										8			8
116.....	3	3		3										11			11
118.....	6	6		1										4			4
120.....	3	3		1										7			7
122.....	3	3		2										3			3
124.....	1	1		2										3			3
126.....	2	2		1										3			3
128.....				1										3			3
130.....				1										3			3
132.....				1										3			3
134.....				1										3			3
136.....														3			3
138.....														3			3
140.....				1										3			3
142.....														3			3
144.....														3			3
146.....														3			3
148.....														3			3
150.....														3			3
158.....														3			3
Totals.....	44	44		29	4	1	34	5	18	9	2	34	1	4	4	1	10
													6	95	17	4	122

TABLE 16
Anchovy—Live Bait Catch, 1955-56 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 PORT HUENEME

Time interval.....	April-May					June-July					August-September					October					Season total						
	54		53		52	55		54	53	52	55		54	53	52	55		54	53	52	55		54	53	52	51	
	1	2	3	T		0	1	2	3	T	0	1	2	3	T	0	1	2	3	4	T	0	1	2	3	4	T
No. of rings.....																											
Standard length mm.																											
100.....						1				1												1					1
102.....						2				2												2					2
104.....																											
106.....						2				2												2					2
108.....																											
110.....																											
112.....																											
114.....																											
116.....						2				2																	
118.....						1				1																	
120.....						1				1																	
122.....						3				3																	
124.....						3				3																	
126.....						3				3																	
128.....						3				3																	
130.....																											
132.....																											
134.....						2				2																	
136.....						1				1																	
138.....						1				1																	
140.....																											
142.....						2				2																	
144.....																											
146.....																											
148.....						1				1																	
150.....						1				1																	
152.....																											
154.....																											
156.....						1				1																	
158.....																											
160.....																											
164.....																											
Totals.....	31	11	2	44		6	25	9	4	44	2	16	11	2	31	2	3	4	1	1	11	10	75	35	9	1	130

TABLE 17
Anchovy—Live Bait Catch, 1955-56 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 SANTA MONICA

Time interval	April-May			June-July			August-September			October			Season total				
	54	53	52	54	53	52	55	54	53	54	53	52	55	54	53	52	
	1	2	3	1	2	T	0	1	2	3	T	1	0	1	2	3	T
No. of rings																	
Standard length mm.																	
90	1													1			1
96	1													1			1
98	1													1			1
100	1													1			1
102	2													2			2
104	1													1			1
106	1													1			1
108																	
110	1																2
112	4													4			4
114														1			1
116	3													5			5
118	4													10			10
120	2													6			6
122	2													11			11
124	6													17			17
126	3													4			4
128	2													5			5
130	1													2			2
132														6			6
134														7			7
136														9			9
138														5			5
140														2			2
142														4			4
144														2			2
146														1			1
148																	
Totals	36	8	1	45	23	7	30	3	24	12	1	40	6	3	9	2	124

TABLE 18

Anchovy—Live Bait Catch, 1955-56 Season
Age and Length Composition, Summarized by Two-Month Intervals
SAN PEDRO

Time interval-----	May				June-July				August-September					Season total				
Year class-----	54	53	52		54	53	52		55	54	53	52		55	54	53	52	
No. of rings-----	1	2	3	T	1	2	3	T	0	1	2	3	T	0	1	2	3	T
Standard length mm.																		
102-----	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	1
104-----	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	1
106-----	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	1
108-----	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	1
118-----	1	--	--	1	2	--	--	2	--	--	--	--	--	--	3	--	--	3
120-----	1	--	--	1	1	--	--	1	--	--	--	--	--	--	2	--	--	2
122-----	2	1	--	3	2	1	--	3	--	2	--	--	2	--	6	--	--	8
124-----	3	--	--	3	2	1	--	3	--	2	--	--	2	--	7	1	--	8
126-----	2	1	--	3	4	--	--	4	--	--	--	--	--	--	6	1	--	7
128-----	1	--	--	1	8	3	--	11	--	3	1	--	4	--	12	4	--	16
130-----	--	3	--	3	2	--	--	2	--	1	3	--	4	--	3	6	--	9
132-----	1	2	--	3	5	4	--	9	--	1	1	--	2	--	7	7	--	14
134-----	--	--	--	--	2	3	1	6	--	3	1	--	4	--	5	4	1	10
136-----	1	1	--	2	2	1	--	3	--	3	1	--	4	--	6	3	--	9
138-----	--	1	1	2	2	2	--	4	--	7	2	9	--	--	2	10	3	15
140-----	--	1	--	1	--	1	--	1	--	1	2	1	4	--	1	4	1	6
142-----	--	1	--	1	--	--	--	--	--	--	1	--	1	--	--	2	--	2
144-----	--	--	--	--	--	--	--	--	--	--	2	--	2	--	--	2	--	2
146-----	--	--	--	--	--	--	--	--	--	--	2	--	2	--	--	2	--	2
148-----	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	1	--	1
150-----	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
152-----	--	--	--	--	--	--	1	1	--	--	1	--	1	--	--	1	1	2
Totals-----	12	11	1	24	32	16	2	50	3	16	23	3	45	3	60	50	6	119

TABLE 19

Anchovy—Live Bait Catch, 1955-56 Season
Age and Length Composition, Summarized by Two-Month Intervals
NEWPORT

Time interval.....	April-May				June				Season total			
Year class.....	54	53	52		54	53	52		54	53	52	
No. of rings.....	1	2	3	T	1	2	3	T	1	2	3	T
Standard length mm.												
114.....	1	--	--	1	--	--	--	--	1	--	--	1
124.....	1	--	--	1	--	--	--	--	1	--	--	1
126.....	1	--	--	1	--	--	--	--	1	--	--	1
128.....	1	--	--	1	--	--	--	--	1	--	--	1
130.....	2	1	--	3	--	--	--	--	2	1	--	3
132.....	1	2	--	3	1	--	--	1	2	2	--	4
134.....	--	2	--	2	1	--	1	2	1	2	1	4
136.....	2	--	--	2	1	--	--	1	3	--	--	3
138.....	--	--	--	--	--	--	--	--	--	--	--	--
140.....	--	3	--	3	--	--	--	--	--	3	--	3
142.....	--	2	--	2	--	--	--	--	--	2	--	2
144.....	--	2	--	2	--	1	--	1	--	3	--	3
146.....	--	1	--	1	--	--	--	--	--	1	--	1
148.....	--	2	--	2	--	--	--	--	--	2	--	2
150.....	--	--	1	1	--	--	--	--	--	--	1	1
Totals.....	9	15	1	25	3	1	1	5	12	16	2	30

TABLE 20

Anchovy—Live Bait Catch, 1955-56 Season
Age and Length Composition, Summarized by Two-Month Intervals
SAN CLEMENTE

Time interval	April-May				June-July				August-September			Season total			
Year class	54	53	52		54	53	52		54	53		54	53	52	
No. of rings	1	2	3	T	1	2	3	T	1	2	T	1	2	3	T
Standard length mm.															
114									3		3	3			3
116															
118	1	1	2		1		1					2	1		3
120	3		3			1		1	3		3	6	1		7
122	2		2		1		1		2	1	3	5	1		6
124	1	2	3		2		2		5	1	6	8	3		11
126		5	5		1	1	2		6	1	7	7	7		14
128	2		2		2		2		1	1	2	5	1		6
130		2	2			1	1			2	2		5		5
132	1	2	3							2	2	1	4		5
134									1	1	2	1	1		2
136		2	2										2		2
138					1		1						1		1
140		2	2										2		2
142															
144						1	1						1		1
146		1	1		1		1						2		2
148			1	1										1	1
150		1	1	2									1	1	2
152			1	1										1	1
154			1	1										1	1
Totals	10	18	4	32	7	5	1	13	21	9	30	38	32	5	75

TABLE 21

Anchovy—Live Bait Catch, 1955-56 Season
Age and Length Composition, Summarized by Two-Month Intervals

OCEANSIDE

Time interval	April-May			June-July				August-September					Season total				
Year class	54	53		55	54	53		55	54	53	52		55	54	53	52	
No. of rings	1	2	T	0	1	2	T	0	1	2	3	T	0	1	2	3	T
Standard length mm.																	
92	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	1
94	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	1
96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
106	--	--	--	--	--	--	--	2	--	--	--	2	2	--	--	--	2
108	--	--	--	1	--	--	1	--	--	--	--	--	1	--	--	--	1
110	2	--	2	--	1	--	1	--	--	--	--	--	--	3	--	--	3
112	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	1
114	1	--	1	--	--	--	--	--	1	--	--	1	--	2	--	--	2
116	3	1	4	--	2	--	2	--	--	--	--	--	--	5	1	--	6
118	3	--	3	--	3	--	3	--	1	--	--	1	--	7	--	--	7
120	3	2	5	--	3	1	4	--	4	--	--	4	--	10	3	--	13
122	--	--	--	--	4	2	6	--	2	1	--	3	--	11	3	--	14
124	4	--	4	--	8	4	12	--	2	--	--	2	--	14	4	--	18
126	1	3	4	--	2	3	5	--	--	2	--	2	--	3	8	--	11
128	--	2	2	--	1	3	4	--	--	--	--	--	--	1	5	--	6
130	--	1	1	--	--	1	1	--	--	1	--	1	--	--	3	--	3
132	1	2	3	--	1	--	1	--	--	2	--	2	--	2	4	--	6
134	1	--	1	--	--	1	1	--	--	--	--	--	--	1	1	--	2
136	--	--	--	--	2	2	--	--	--	--	--	--	--	--	2	--	2
138	--	1	1	--	--	--	--	--	1	--	--	1	--	--	2	--	2
140	--	--	--	--	--	--	--	--	1	--	--	1	--	--	1	--	1
142	--	--	--	--	--	--	--	--	--	1	--	1	--	--	1	--	1
144	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	1	1
Totals	24	12	36	1	25	17	43	5	10	9	1	25	6	59	38	1	104

TABLE 22

Anchovy—Live Bait Catch, 1955-56 Season
Age and Length Composition, Summarized by Two-Month Intervals

SAN DIEGO

Time interval-----	April-May				June-July				August-September					Season total				
Year class-----	54	53	52		54	53	52		55	54	53	52		55	54	53	52	
No. of rings-----	1	2	3	T	1	2	3	T	0	1	2	3	T	0	1	2	3	T
Standard length mm.																		
98-----									1				1	1				1
100-----									3				3	3				3
102-----									1				1	1				1
104-----																		
106-----																		
112-----					1			1							1			1
114-----					1	1		1		1			1		1	1		2
116-----					1			1							1			1
118-----	1			1	1			2		1			2		3	1		4
120-----		1		1	1	1		2		1			1		1	3		4
122-----		1		1	1	1		1					1		1	3		4
124-----		3		3	1			1		2	1		3		3	4		7
126-----		1		1		3		3			1		1			5		5
128-----		1		1	1	4	2	7			2	1	3		1	7	3	11
130-----						4		4								4		4
132-----		3		3		4		4		2	5		7		2	12		14
134-----	1	2	1	4	1	3		4			4		4		2	9	1	12
136-----		2		2		2		2			2		2			6		6
138-----		1		1		1		1			1		1			3		4
140-----				1			1	1									2	2
142-----				1							1	1	2			1	2	3
144-----		1		1												1		1
146-----				1	1						1		1			1	1	2
148-----																		
150-----											1					1		1
152-----				1	1											1		1
Totals-----	2	16	6	24	8	24	3	35	5	6	22	2	35	5	16	62	11	94

TABLE 23

Age (Year Class) Composition of the Anchovy Live Bait Catch in the 1955-56 Season

(Numbers of fish are given in thousands, i.e., 000 omitted)

	Catch		Number of fish by age and year class				
			0	1	2	3	4
	Tons	Nos.	1955	1954	1953	1952	1951
Santa Barbara							
April-May	50	3,439	--	3,439	--	--	--
June-July	78	4,125	--	3,738	342	45	--
August-September	51	2,428	478	1,401	449	100	--
October-November	25	1,020	122	439	449	10	--
December-January	5	203	114	89	--	--	--
Totals Santa Barbara	209	11,215	714	9,106	1,240	155	--
Port Hueneme							
April-May	15	684	--	523	139	22	--
June-July	31	1,375	227	829	202	117	--
August-September	16	726	110	377	183	56	--
October-November	10	283	5	108	136	31	3
Totals Port Hueneme	72	3,068	342	1,837	660	226	3
Santa Monica							
April-May	118	4,176	--	3,666	480	30	--
June-July	182	8,015	--	6,228	1,787	--	--
August-September	161	7,628	1,159	4,791	1,579	99	--
October-November	48	2,395	--	1,724	671	--	--
December-January	--	--	--	--	--	--	--
February-March	13	563	273	260	30	--	--
Totals Santa Monica	522	22,777	1,432	16,669	4,547	129	--
San Pedro							
April-May	468	20,526	82	11,905	7,882	657	--
June-July	878	36,537	365	24,261	10,376	1,535	--
August-September	860	35,179	3,905	11,574	16,710	2,990	--
October-November	80	3,274	364	1,077	1,555	278	--
December-January	--	--	--	--	--	--	--
February-March	43	1,620	1,126	421	73	--	--
Totals San Pedro	2,329	97,136	5,842	49,238	36,596	5,460	--
Newport							
April-May	98	3,543	--	1,835	1,478	230	--
June-July	223	9,381	544	7,429	704	704	--
August-September	185	7,588	842	2,497	3,604	645	--
October-November	25	1,050	117	345	499	89	--
December-January	2	79	29	41	9	--	--
February-March	15	618	224	324	70	--	--
Totals Newport	548	22,259	1,756	12,471	6,364	1,668	--
San Clemente							
April-May	28	1,174	--	418	690	66	--
June-July	70	3,412	17	2,183	1,143	69	--
August-September	45	2,191	18	1,604	569	--	--
February-March	2	116	60	54	2	--	--
Totals San Clemente	145	6,893	95	4,259	2,404	135	--
Oceanside							
April-May	37	2,075	6	1,428	629	12	--
June-July	74	4,377	766	2,355	1,256	--	--
August-September	86	4,897	1,411	1,939	1,371	176	--
October-November	4	227	65	90	64	8	--
December-January	--	--	--	--	--	--	--
February-March	2	72	51	19	2	--	--
Totals Oceanside	203	11,648	2,299	5,831	3,322	196	--
San Diego							
April-May	498	18,748	--	1,312	13,780	3,656	--
June-July	697	29,079	494	5,874	19,919	2,792	--
August-September	542	27,204	5,142	4,870	15,561	1,631	--
October-November	168	8,418	1,591	1,507	4,815	505	--
December-January	22	1,102	208	197	631	66	--
February-March	69	3,215	2,515	557	122	21	--
Totals San Diego	1,996	87,766	9,950	14,317	54,828	8,671	--
Totals Southern California	6,024	262,762	22,430	113,728	109,961	16,640	3

TABLE 24

Anchovy—Live Bait Catch, 1955-56 Season
Percentage Composition and Mean Length of Fish by Age and Year Class
Summarized for Each Port by Two-Month Intervals

	Percentage composition by age and year class					Mean length by age and year class					Avg.	No. fish aged
	0	1	2	3	4	0	1	2	3	4		
	1955	1954	1953	1952	1951	1955	1954	1953	1952	1951		
Santa Barbara												
April-May	--	100.0	--	--	--	--	109	--	--	--	109	44
June-July	--	90.6	8.3	1.1	--	--	117	142	126	--	120	34
August-September	19.7	57.7	18.5	4.1	--	115	123	138	144	--	127	34
October	12.0	43.0	44.0	1.0	--	116	125	133	158	--	131	10
Season Santa Barbara	6.4	81.2	11.1	1.3	--	115	121	138	143	--	124	122
Port Hueneme												
April-May	--	76.4	20.4	3.2	--	--	120	139	149	--	126	44
June-July	16.5	60.3	14.7	8.5	--	107	121	136	148	--	125	45
August-September	15.1	52.0	25.2	7.7	--	115	123	148	152	--	133	30
October	2.0	38.0	48.0	11.0	1.0	117	132	142	160	164	138	11
Season Port Hueneme	11.1	59.7	21.7	7.4	0.1	111	122	141	150	164	128	130
Santa Monica												
April-May	--	87.8	11.5	0.7	--	--	116	137	144	--	120	45
June-July	--	77.7	22.3	--	--	--	124	127	--	--	125	30
August-September	15.2	62.8	20.7	1.3	--	119	124	132	144	--	126	40
October	--	72.0	28.0	--	--	--	126	131	--	--	127	9
Season Santa Monica	6.3	73.2	19.9	0.6	--	119	121	133	144	--	124	124
San Pedro												
May	0.4	58.0	38.4	3.2	--	--	125	132	138	--	129	24
June-July	1.0	66.4	28.4	4.2	--	--	128	132	143	--	130	50
August-September	11.1	32.9	47.5	8.5	--	105	130	139	139	--	134	45
Season San Pedro	6.0	50.7	37.6	5.7	--	105	128	135	140	--	131	119
Newport												
April-May	--	51.8	41.7	6.5	--	--	128	140	150	--	136	25
June	5.8	79.2	7.5	7.5	--	--	134	144	134	--	136	5
Season Newport	7.9	56.0	28.6	7.5	--	--	130	140	142	--	136	30
San Clemente												
April-May	--	35.6	58.8	5.6	--	--	123	132	151	--	131	32
June-July	0.5	64.0	33.5	2.0	--	--	124	132	144	--	129	13
August-September	0.8	73.2	26.0	--	--	--	123	129	--	--	125	30
Season San Clemente	1.3	61.8	34.9	2.0	--	--	123	131	150	--	128	75
Oceanside												
April-May	0.3	68.8	30.3	0.6	--	--	121	127	--	--	127	36
June-July	17.5	53.8	28.7	--	--	108	122	127	--	--	124	43
August-September	28.8	39.6	28.0	3.6	--	102	120	132	144	--	122	25
Season Oceanside	19.7	50.1	28.5	1.7	--	103	121	128	144	--	123	104
San Diego												
April-May	--	7.0	73.5	19.5	--	--	126	130	142	--	133	24
June-July	1.7	20.2	68.5	9.6	--	--	122	129	132	--	128	35
August-September	18.9	17.9	57.2	6.0	--	102	124	132	135	--	127	35
Season San Diego	11.3	16.3	62.5	9.9	--	102	123	131	138	--	129	94
Season Southern California	8.8	43.0	41.8	6.4	--							

TABLE 25
Anchovy—Live Bait Catch, 1956-57 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 SANTA BARBARA

Time interval	April-May				June-July				August-September				October				Season total				
	55		54		55	54	53	56	55	54	53	54	53	56	55	54	53				
	1	2	T	1	2	3	T	0	1	2	3	T	2	3	T	0	1	2	3	T	
No. of rings																					
Standard length mm.																					
94	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	--	
102	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	
104	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
106	1	--	1	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	
108	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
110	--	--	2	--	--	--	--	1	--	--	--	--	--	--	1	2	--	--	--	3	
112	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
114	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
116	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	1	
118	1	5	1	1	--	--	--	3	2	--	--	--	--	8	4	--	--	--	--	4	
120	4	1	1	1	1	--	1	--	2	--	--	--	--	--	7	1	1	1	1	1	
122	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
124	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
126	2	2	4	3	--	--	--	--	1	1	--	--	--	--	3	3	0	--	--	6	
128	2	1	3	--	4	1	--	1	1	--	--	--	--	--	2	2	1	1	1	5	
130	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	
132	13	2	1	1	2	1	--	1	2	--	--	--	--	--	2	2	3	3	4	5	
134	1	4	1	2	1	--	--	1	--	--	--	--	--	--	1	1	4	1	1	2	
136	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
138	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
140	--	1	1	1	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	
142	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	1	
144	--	--	--	--	--	--	--	--	--	4	--	--	--	--	--	--	--	--	--	3	
146	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	1	
148	--	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	
150	--	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	
152	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	4	
154	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	2	
162	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	
164	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	
Totals	14	14	28		6	19	3	28	2	10	20	3	35	1	3	4	2	30	54	9	95

TABLE 26

Anchovy—Live Bait Catch, 1956-57 Season
Age and Length Composition, Summarized by Two-Month Intervals

PORT HUENEME

Time interval.....	April-May			June-July						Aug.-Sept.			Season total				
Year class.....	54	53		55	54	53	52			55	54		55	54	53	52	
No. of rings.....	2	3	T	1	2	3	4	T		1	2	T	1	2	3	4	T
Standard length mm.																	
112.....	1	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	1
118.....	--	--	--	1	--	--	--	1	--	--	--	--	1	--	--	--	1
120.....	--	--	--	--	--	--	--	--	1	--	1	--	1	--	--	--	1
122.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
124.....	--	--	--	--	1	--	--	1	--	--	--	--	--	1	--	--	1
126.....	--	--	--	1	1	--	--	2	--	--	--	--	1	1	--	--	2
128.....	--	--	--	2	1	--	--	3	--	--	--	--	2	3	--	--	5
130.....	2	--	2	1	2	--	--	3	--	1	1	2	2	3	--	--	5
132.....	1	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	1
134.....	--	--	--	--	3	--	--	3	--	1	1	--	--	4	--	--	4
136.....	--	--	--	--	--	1	--	1	--	1	1	--	--	1	1	--	2
138.....	1	--	1	1	1	--	--	2	--	--	--	--	1	2	--	--	3
140.....	--	--	--	1	--	1	--	2	--	--	--	--	--	--	--	1	2
142.....	--	--	--	--	--	1	--	1	--	1	1	--	--	1	1	--	2
144.....	--	--	--	1	1	1	--	3	--	--	--	--	1	1	1	--	3
146.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
148.....	1	--	1	--	1	--	--	1	--	1	1	--	--	3	--	--	3
150.....	--	--	--	--	1	--	--	1	--	--	--	--	--	1	--	--	1
152.....	--	--	--	--	3	2	--	5	--	1	1	--	--	4	2	--	6
154.....	--	--	--	--	1	1	--	2	--	--	--	--	--	1	1	--	2
160.....	--	1	1	--	--	--	--	--	--	--	--	--	--	--	1	--	1
162.....	--	--	--	--	--	1	--	1	--	--	--	--	--	--	1	--	1
164.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
166.....	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	1	1
Totals.....	6	1	7	8	16	8	1	33	--	2	6	8	10	28	9	1	48

TABLE 27

Anchovy—Live Bait Catch, 1956-57 Season
 Age and Length Composition, Summarized by Two-Month Intervals

MALIBU

Time interval	April-May			June-July					August-September					Season total					
Year class	55	54		55	54	53	52		56	55	54	53		56	55	54	53	52	
No. of rings	1	2	T	1	2	3	4	T	0	1	2	3	T	0	1	2	3	4	T
Standard length mm.																			
88	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	--	1
98	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	--	1
110	1	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1
112	1	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1
114	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
116	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	--	1
118	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--	--	1
120	--	--	--	2	--	--	--	2	--	--	--	--	--	2	--	--	--	--	2
122	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	1	--	--	1
124	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
126	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
128	1	1	2	1	2	--	--	3	1	1	--	--	2	3	4	--	--	--	7
130	--	--	--	1	2	--	--	3	1	1	--	--	2	2	3	--	--	--	5
132	1	1	2	1	1	--	--	1	1	2	--	--	3	2	4	--	--	--	6
134	--	--	--	1	1	--	--	2	--	--	--	--	--	1	1	--	--	--	2
136	--	--	--	--	2	--	--	2	--	1	--	--	1	--	3	--	--	--	3
138	--	--	--	--	--	--	--	--	1	1	--	--	2	1	1	--	--	--	2
140	--	--	--	--	1	1	--	2	--	--	--	--	--	--	1	1	--	--	2
142	--	--	--	--	--	--	--	--	--	2	1	--	3	--	2	1	--	--	3
144	--	1	1	--	1	--	--	1	--	--	--	--	--	--	2	--	--	--	2
146	--	--	--	--	2	2	--	4	--	1	--	--	1	--	3	2	--	--	5
148	--	1	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1
150	--	--	--	--	1	--	--	1	--	1	1	--	2	--	2	1	--	--	3
152	--	--	--	--	1	--	--	1	--	--	--	--	--	--	1	--	--	--	1
154	--	--	--	--	1	--	--	1	--	2	--	--	2	--	3	--	--	--	3
156	--	--	--	--	--	--	1	1	--	--	2	--	2	--	--	2	1	--	3
Totals	4	4	8	5	15	3	1	24	2	6	13	4	25	2	15	32	7	1	57

TABLE 28
 Anchovy—Live Bait Catch, 1956-57 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 SANTA MONICA

Time interval.....	April-May				June-July				August-September				October				Season total									
	55	54	53		55	54	53		56	55	54	53	52	55	54	53	52	56	55	54	53	52				
	1	2	3	T	1	2	3	T	0	1	2	3	4	T	1	2	3	4	0	1	2	3	4	T		
Standard length mm.																										
94.....	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	1	--	--	--	--	1		
104.....	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	1	--	--	--	--	1		
106.....	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	1	--	--	--	--	1		
108.....	1	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--		
110.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
116.....	1	--	--	--	--	1	--	--	1	1	--	--	--	1	--	--	--	--	--	3	--	--	--	3		
118.....	2	2	--	--	--	2	4	--	--	3	--	--	--	2	3	--	--	--	--	5	2	--	--	7		
120.....	1	--	--	--	--	1	--	--	--	4	--	--	--	--	--	--	--	--	--	9	--	--	--	11		
122.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
124.....	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
126.....	2	1	--	--	--	1	1	--	--	2	--	--	--	2	--	--	--	--	--	2	3	--	--	6		
128.....	3	2	--	--	--	1	2	--	--	3	--	--	--	3	--	--	--	--	--	6	4	--	--	10		
130.....	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	3	4	--	--	7		
132.....	1	3	1	--	--	5	--	--	--	2	--	--	--	5	--	--	--	--	--	3	8	--	--	12		
134.....	--	--	--	--	--	1	1	--	--	2	--	--	--	2	--	--	--	--	--	1	5	--	--	5		
136.....	--	--	--	--	--	--	2	1	--	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
138.....	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
140.....	1	--	--	--	--	--	--	--	--	--	--	1	--	--	2	3	--	--	--	2	1	--	--	2		
142.....	--	2	--	--	--	--	1	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
144.....	--	--	--	--	--	--	1	--	--	1	--	--	--	--	1	--	--	--	--	--	--	--	--	--		
146.....	--	1	--	--	--	--	2	1	--	3	--	--	--	1	--	--	--	--	--	--	--	--	--	--		
148.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
150.....	--	--	--	--	--	--	1	--	--	1	--	--	--	--	1	--	--	--	--	--	--	--	--	--		
152.....	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
154.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
156.....	--	1	--	--	--	--	3	4	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--		
158.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
160.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--		
162.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
170.....	--	--	4	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2		
Totals.....	12	15	4	31	--	10	18	12	40	--	3	16	18	2	2	1	3	0	1	5	3	39	54	18	3	117

TABLE 29

Anchovy—Live Bait Catch, 1956-57 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 SAN PEDRO

Time interval-----	April-May				June-July					August-September				Season total				
Year class-----	55	54	53		55	54	53	52		55	54	53		55	54	53	52	
No. of rings-----	1	2	3	T	1	2	3	4	T	1	2	3	T	1	2	3	4	T
Standard length mm.																		
96-----	1			1										1				1
106-----	1			1										1				1
108-----	1			1										1				1
110-----																		
112-----	1			1										1				1
114-----					1				1					1				1
116-----	1			1										1				1
118-----	1			1	1				1					2				2
120-----										1			1	1				1
126-----	2			2	1	1			2					3	1			4
128-----	1			1		2			2		2			1	4			5
130-----		1		1		1			1	1	1			1	3			4
132-----	2	1		3		1			1		1			2	3			5
134-----										1	1		2	1	1			2
136-----						2			2						2			2
138-----							1		1		1		1		1	1		2
140-----	1			1		1	1		2	1			1	2	1	1		4
142-----		1		1			1		1						1	1		2
144-----		1		1		1			1						1			2
146-----										2			2		2			2
148-----							1		1		1		1		2			2
150-----							2		2		3		3		3	2		5
152-----		2	1	3						2	1	3			4	2		6
154-----			1	1		2			2			1	1		2	1		3
156-----								1	1								1	2
170-----												1	1			1		1
Totals-----	12	6	2	20	3	11	6	1	21	4	13	4	21	19	30	12	1	62

TABLE 30
Anchovy—Live Bait Catch, 1956-57 Season
 Age and Length Composition, Summarized by Two-Month Intervals
 NEWPORT

Time interval	April-May					June-July					August-September					November					Season total						
	55	54	53			55	54	53	52	51	56	55	54	53	52	55	54	53	52	51	56	55	54	53	52	51	
Year class	1	2	3	T		1	2	3	4	5	T	0	1	2	3	T	1	2	3	T	0	1	2	3	4	5	T
No. of rings																											
Standard length mm.																											
98	2											1									1	2					1 2 2
100												1									1						1 1
102																											1 1
108	1											1									1	1					2 2
110	2																										2 2
112																											2 2
114												1									1	1					1 2
116	1																										2 2
118	4											1															2 2
120	1											1															2 2
122	1											1															2 2
124																											2 2
126												1															2 2
128	2											1									1	1					2 2
130	1																										2 2
132	1											1									1	4					2 2
134																											2 2
136																											2 2
138	1											1															2 2
140																											2 2
142																											2 2
144																											2 2
146																											2 2
148																											2 2
150																											2 2
152																											2 2
154																											2 2
156																											2 2
162																											2 2
Totals	17	19	8	44		7	17	5	0	1	30	5	14	18	3	40	1	2	2	5	5	39	56	18	0	1	119

TABLE 31

Anchovy—Live Bait Catch, 1956-57 Season
Age and Length Composition, Summarized by Two-Month Intervals
SAN CLEMENTE

Time interval-----	April-May				June-July					Aug.-Sept.					Season total					
Year class-----	55	54	53		55	54	53	52		56	55	54	53		56	55	54	53	52	T
No. of rings-----	1	2	3	T	1	2	3	4	T	0	1	2	3	T	0	1	2	3	4	T
Standard length mm.																				
94-----										1				1	1					1
106-----										2				2	2					2
108-----																				
110-----	1			1						1				1	1					1
112-----																				1
114-----	1			1	1				1					1	2					2
116-----										1				1	1					1
118-----	1			1						1				1	1					2
120-----					1				1					1	1	1				2
122-----					1				1		1			1	1					1
124-----	1			1											1					1
126-----	3			3	1	1			2	2				2	6	1				7
128-----	1			1	1	2			3					1	3	2				5
130-----		1		1	1				1	1	3	1	5		2	4	1			7
132-----		1		1		1			1						2					2
134-----	2	1		3	2	3			5	1	1		2		5	5				10
136-----		1		1						1	1	1	3		1	2	1			4
138-----						1		1							1		1			1
140-----										1				1	1					1
142-----		1		1		1			1	1		1	2		1	2	1			4
144-----		1		1		3			3		2		2		6					6
146-----		2		2		2			2						2	2				4
148-----		1		1											1					1
150-----										1	1		2		1	1				2
152-----		3		3											3					3
154-----							1	1										1		1
156-----																				
158-----			1	1			1		1								2			2
160-----			1	1							1	1					2			2
Totals-----	10	12	2	24	8	11	4	1	24	5	10	9	4	28	5	28	32	10	1	76

TABLE 33
Anchovy—Live Baif Catch, 1956-57 Season
Age and Length Composition, Summarized by Two-Month Intervals
SAN DIEGO

TABLE 34
 Age (Year Class) Composition of the Anchovy Live Bait Catch in the 1956-57 Season
 (Numbers of fish are given in thousands, i.e., 000 omitted)

	Catch		Number of fish by age and year class					
	Tons	Nos.	0	1	2	3	4	5
			1956	1955	1954	1953	1952	1951
Santa Barbara								
April-May	13	629	--	349	280	--	--	--
June-July	3	110	--	32	73	5	--	--
August-September	14	538	58	120	323	37	--	--
October	31	902	--	36	595	271	--	--
Totals Santa Barbara	61	2,179	58	537	1,271	313	--	--
Port Hueneme								
April-May	15	529	--	556	513	16	--	--
June-July	60	1,947	10	434	1,034	341	6	--
August-September	67	2,169	87	--	1,648	--	--	--
Totals Port Hueneme	142	4,645	97	990	3,195	357	6	--
Malibu								
April-May	14	569	--	307	262	--	--	--
June-July	20	664	--	115	451	88	10	--
August-September	17	628	18	166	379	65	--	--
Totals Malibu	51	1,861	18	588	1,092	153	10	--
Santa Monica								
April-May	61	2,266	--	1,099	1,048	119	--	--
June-July	125	4,652	--	2,011	3,027	562	--	--
August-September	110	4,371	272	209	1,962	68	58	--
October	10	401	--	--	184	--	8	--
Totals Santa Monica	306	11,690	272	4,382	6,221	749	66	--

San Pedro	422	15,989	--	11,112	4,157	720	--
April-May	1,135	39,699	--	3,521	23,688	12,164	--
June-July	1,162	43,388	369	10,209	29,348	3,462	--
August-September	232	8,666	74	2,039	5,862	691	--
October-November							--
Totals San Pedro	2,951	107,742	443	26,881	63,055	17,037	326
Newport							
April-May	60	2,368	--	859	1,243	266	36
June-July	166	6,240	--	1,105	4,600	499	--
August-September	111	4,233	310	1,665	2,201	57	--
October-November	18	567	11	131	374	51	--
Totals Newport	355	13,408	321	3,760	8,418	873	36
San Clemente							
April-May	65	2,568	--	1,325	1,202	41	--
June-July	111	4,197	--	1,339	2,098	490	70
August-September	117	5,028	250	2,325	1,735	679	--
October-November	17	758	15	318	304	121	--
Totals San Clemente	310	12,551	304	5,507	5,339	1,331	70
Oceanside							
April-May	36	1,588	--	1,125	410	53	--
June-July	77	3,263	--	1,943	985	288	47
August-September	60	2,638	173	1,771	626	68	--
October (catch not reported)							--
Totals Oceanside	173	7,489	173	4,839	2,021	409	47
San Diego							
April-May	557	25,971	405	19,912	4,501	982	171
June-July	919	37,056	1,164	25,198	6,248	4,446	--
August-September	632	26,433	764	20,089	4,993	587	--
October-November	106	5,239	943	3,301	943	52	--
Totals San Diego	2,214	94,699	3,276	68,500	16,685	6,067	171
Totals Southern California	6,563	256,264	4,962	115,984	107,297	27,289	696
							36

TABLE 35
Anchovy Live Bait Catch, 1956-57 Season
Percentage Composition and Mean Length of Fish by Age and Year Class Summarized for Each Port by Two-Month Intervals

	Percentage composition by age and year class					Mean length by age and year class					No. fish aged
	0	1	2	3	4	5	0	1	2	3	
	1956	1955	1954	1953	1952	1951	1956	1955	1954	1953	
Santa Barbara											
April-May	--	55.5	44.5	--	--	--	--	121	135	--	28
June-July	--	29.0	66.8	4.2	--	--	--	131	139	152	28
August-September	10.9	22.2	60.0	6.9	--	--	102	120	148	--	35
October	--	4.0	66.0	30.0	--	--	--	--	152	149	4
Season Santa Barbara	3.8	33.7	57.6	4.9	--	--	102	123	138	149	95
Port Hueneme											
April-May	0.5	28.6	97.0	3.0	--	--	--	132	131	160	7
June-July	4.0	20.0	53.1	17.5	0.3	--	--	125	139	148	33
August-September	--	--	76.0	--	--	--	--	--	140	--	8
Season Port Hueneme	1.0	22.3	64.3	12.2	0.2	--	--	130	138	149	48
Malibu											
April-May	--	54.0	46.0	13.2	1.5	--	--	120	138	--	8
June-July	--	17.3	68.0	10.3	--	--	93	126	139	144	24
August-September	2.9	26.5	60.3	10.3	--	--	--	127	139	151	25
Season Malibu	1.1	26.0	62.0	10.2	0.7	--	93	125	139	148	57
Santa Monica											
April-May	--	48.5	46.2	5.3	--	--	--	124	135	156	31
June-July	--	22.9	65.1	12.0	--	--	--	123	135	151	40
August-September	6.2	46.0	44.9	1.6	1.3	--	101	123	137	152	41
October	--	52.0	46.0	--	2.0	--	--	120	140	144	5
Season Santa Monica	2.1	39.9	51.5	5.9	0.6	--	101	124	136	152	117

TABLE 36
 Age (Year Class) Composition of the Total Anchovy Catch (Commercial and Live Bail Combined) in the 1955-56 Season
 (Numbers of fish are given in thousands, i.e., 000 omitted)

	Catch		Number of fish by age and year class						
			0	1	2	3	4	5	
	Tons	Nos.	1955	1954	1953	1952	1951	1950	
Monterey									
April-May	1,109	42,602		34,827	5,112	2,079	320	264	
June-July	840	23,806	1,102	21,009	1,519	88	60	28	
August-September	536	12,146		10,850	1,296				
October-November	369	1,156	116	994	46				
December-January									
February-March	1,259	43,922	11,275	30,012	2,051	584			
Totals Monterey	4,113	123,632	12,493	97,692	10,024	2,751	380	292	
Totals Central California	4,113	123,632	12,493	97,692	10,024	2,751	380	292	
Santa Barbara									
April-May	472	22,223		17,792	3,829	602			
June-July	259	12,050	1,307	8,517	1,504	722			
August-September	307	14,394	2,285	7,623	3,465	1,021			
October-November	88	3,247	166	1,286	1,518	255	22		
December-January	25	882	18	335	423	97	9		
February-March	27	941	42	704	180	15			
Totals Santa Barbara	1,178	53,737	3,818	36,257	10,919	2,712	31		

TABLE 37
Age (Year Class) Composition of the Total Anchovy Catch (Commercial and Live Bait Combined) in the 1956-57 Season
(Numbers of fish are given in thousands, i.e., 000 omitted)

	Catch		Number of fish by age and year class					
	Tons	Nos.	0	1	2	3	4	5
			1956	1955	1954	1953	1952	1951
Monterey								
April-May	2,577	73,975	--	6,806	59,476	5,622	2,071	--
June-July	55	1,577	--	145	1,268	120	44	--
August-September	539	10,387	--	106	8,554	1,821	--	106
October-November	400	12,405	5,582	2,233	8,722	868	--	--
December-January	5	180	81	32	54	13	--	--
February-March	33	942	283	75	565	19	--	--
Totals Monterey	3,609	99,666	5,946	9,397	73,639	8,463	2,115	106
Totals Central California	3,609	99,666	5,946	9,397	73,639	8,463	2,115	106
Santa Barbara								
April-May	97	4,086	--	1,231	2,798	57	--	--
June-July	114	3,918	19	1,120	2,108	659	12	--
August-September	205	7,470	399	1,529	5,439	103	--	--
October-November	32	922	--	37	608	277	--	--
Totals Santa Barbara	453	16,396	418	3,917	10,953	1,096	12	--
Los Angeles								
April-May	4,181	143,045	--	38,559	87,430	14,935	2,121	--
June-July	4,933	246,545	--	56,473	151,807	35,091	3,138	36
August-September	4,779	165,532	1,258	33,795	112,676	15,745	58	--
October-November	3,521	117,422	1,705	12,865	54,888	44,745	3,219	--
December-January	4,694	150,558	7,317	22,373	88,182	24,947	5,586	2,153
February-March	5,343	167,663	2,431	33,231	110,051	21,343	604	--
Totals Los Angeles	27,451	990,765	12,711	199,296	605,037	156,806	14,726	2,189
San Diego								
April-May	593	27,559	405	21,037	4,911	1,035	171	--
June-July	996	40,319	1,164	27,141	7,233	4,734	47	--
August-September	692	29,071	937	21,860	5,619	655	--	--
October-November	106	5,239	943	3,301	943	52	--	--
Totals San Diego	2,387	102,188	3,449	73,339	18,706	6,476	218	--
Totals Southern California	30,291	1,109,349	16,578	276,552	634,696	164,378	14,956	2,189
Grand Totals California	33,900	1,209,015	22,524	285,949	708,335	172,841	17,071	2,295